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ON

CONTRACTION OF THE FINGERS

(DUPUYTREN'S CONTRACTION).

ALSO ON THE

OBLITERATION OF DEPRESSED CICATRICES.

OBSERVATIONS

ON

CONTRACTION OF THE FINGERS

(DUPUYTREN'S CONTRACTION)

AND ITS SUCCESSFUL TREATMENT BY SUBCUTANEOUS DIVISIONS
OF THE PALMAR FASCIA, AND IMMEDIATE EXTENSION.

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ALSO ON THE

OBLITERATION OF DEPRESSED CICATRICES

AFTER

GLANDULAR ABSCESSES, OR EXFOLIATION OF BONE

BY A

SUBCUTANEOUS OPERATION.

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BY

WILLIAM ADAMS, F.R.C.S.,

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CONSULTING SURGEON TO THE NATIONAL ORTHOPÆDIC HOSPITAL
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PREFACE.

In the Essays now published I have given a description of two subcutaneous operations for the successful treatment of affections not generally considered to be amenable to any surgical means, viz.: "*Dupuytren's Contraction of the Fingers*," and "*Deeply Depressed Cicatrices*," such as are frequently met with in the neck and other regions of the body, as the result either of glandular abscesses or exfoliation of bone.

In proof of the general distrust in all operative procedures for contracted fingers, I may state that in nearly all the cases which have fallen under my observation in private practice, the patients have been deterred from submitting to any operation by the opinions of several surgeons that the fingers if straightened would remain stiff and useless, or worse than useless, for life, in consequence of the tendons having been divided, an event which I have shown cannot possibly occur in the operation advocated in the present paper.

The patients have in many instances been told that as the contracted fingers are still useful in grasping, they should wait until they had become useless by increase of the contraction, and then take the chances of an operation. Now that the curability of this affection, without any loss of muscular power has been proved, the error of delay will be at once apparent.

The results of mechanical treatment, and of the operation by open-wound have not been such as to inspire any general confidence.

The subcutaneous operation and after-treatment, as modified by myself in accordance with the pathological conditions first demonstrated by Dupuytren, has proved so successful, that I can with confidence recommend it to the favourable notice of the profession.

I first brought the results of my experience before the Medico-Chirurgical Society in a paper read on the 22nd of May, 1877, but this paper was not published by the Society in their "Transactions;" a short abstract of it only appeared in the "Proceedings" of the Society, Vol. VIII., No. 4, July, 1877. The paper, as read at the Society, and without any alterations, was, however, published in the "British Medical Journal," June 29th, 1878, and is now with considerable additions reproduced in its present form.

With regard to the subcutaneous operation for deeply depressed cicatrices, I first brought it before the notice of the British Medical Association in a paper which I read at their meeting in Edinburgh in August, 1875; and it was afterwards published in the "British Medical Journal," April 20th, 1876. It seems, however, not to have attracted the attention of operating surgeons so much as I could have wished, and I have therefore reproduced it with additions, in its present form, in the full confidence that results equal to those which I have obtained would follow its more general adoption.

The two operations, now described, possess one feature in common, viz., that they are both good examples of the success which attends all true subcutaneous operations, and in their freedom from all danger which might result from inflammation and suppuration, illustrate the protective influence of the law of subcutaneous surgery.

Henrietta Street, Cavendish Square.
September, 1879.

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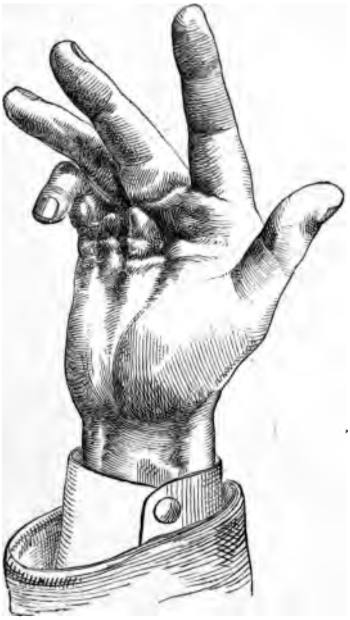
PLATE I.

FIG. 11.



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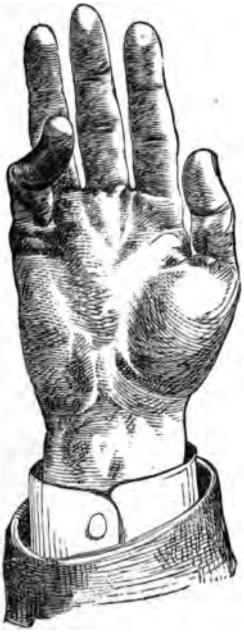

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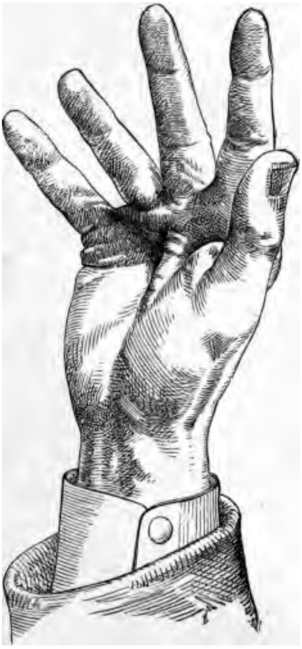

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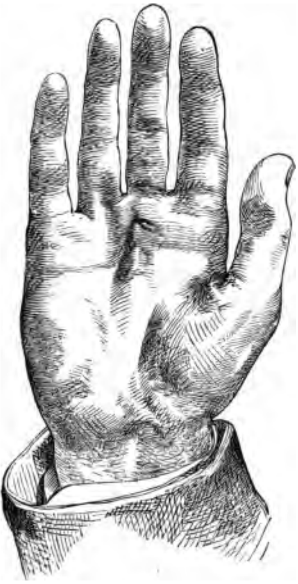


DESCRIPTION OF PLATE I.

Fig. 11 showing right hand of a gentleman æt. 55, upon whom I operated in February, 1864, Dupuytren's contraction of middle, ring, and little fingers, with two prominent cords, or bands of palmar fascia, leading from the first phalanges of the middle and ring-fingers towards the centre of the palm of the hand; the second phalanges of these two fingers were not involved in the contraction. The little finger is drawn down partly by one of the central bands, and partly by an external lateral band. In this finger, also, the second phalanx was contracted, and drawn down at a right angle with the first, partly by fascial contraction, and partly articular changes resulting from rheumatic gout and aggravated by an accident. This gentleman had for many years been engaged in the diplomatic service, in which he still continues, and had not used this hand in any special manner. He is a member of a very gouty family, and although he has not suffered from acute gout in the great toe, he has been subject to other gouty affections, and many of the articulations of the fingers were a little enlarged and altered in shape by rheumatic gout. The contraction of the little finger had commenced five years previously, and the middle and ring-fingers between three and four years. The effect of the contraction, chiefly from the drawing down of the middle fingers, was to interfere with his power of writing, so that his signature was scarcely legible. Six punctures were made at the operation, and the extension was made as rapidly as it could be borne by the patient—an instrument similar to that represented in Fig. 10 being used. The middle and ring-fingers were straightened in a fortnight, but the little finger took nearly six weeks, and then the contraction between the first and second phalanges could not be completely overcome in consequence of articular changes. Drawing taken from a cast.

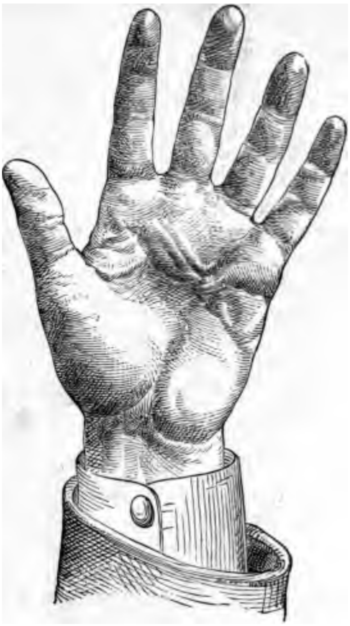
Fig. 12.—The same hand as shown in Fig. 11, thirteen years after operation. The middle and ring-fingers remained permanently cured, with full power of flexion; and all trace of contraction in the palm of the hand had disappeared. The contraction of the little finger, which never could be brought quite straight, from alterations in the joint, had relapsed to some extent, between the first and second phalanges—but the first phalanx remains on a straight line with the metacarpal bone. Drawing taken from a cast.

Fig. 13, showing right hand of a medical man, æt. about 60, upon whom I operated in January, 1877. Dupuytren's contraction of middle and ring-fingers, with a tense prominent cord, or band of palmar fascia, leading from the first phalanges of the fingers towards the centre of the palm of the hand. The second phalanges were not involved in the contraction. This gentleman has suffered from gouty affections for many years, and several of the articulations of the fingers are enlarged and altered in shape, though he has not been the subject of acute gout. The contraction had commenced eight or ten years before the operation, and was steadily increasing, so that as a professional man the inconvenience was found to be very great. The operation was performed under the ether-spray, as described at page 61, four punctures being made. All the contraction was completely overcome at the time of operation, and the method of immediate extension was successfully carried out. The fingers being retained in position by the splint and bandage represented in Fig. 6, and the splint applied on the dorsal aspect of the hand and finger represented in Fig. 9, was afterwards employed as described at page 57. Drawing taken from a cast.

Fig. 14.—The same hand as shown in Fig. 13, more than two years after the operation. The fingers remain quite straight with full power of flexion, a little thickening of the skin at the seat of contraction only remains. Drawing taken from a photograph.

PLATE II.

FIG. 15.



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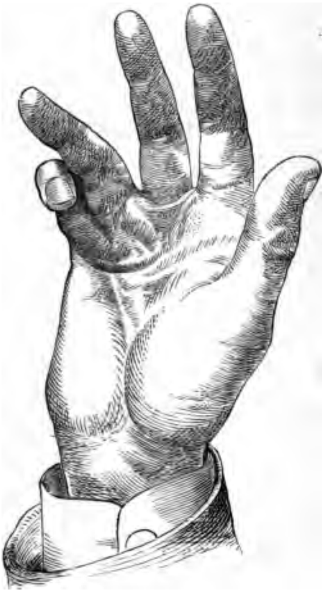

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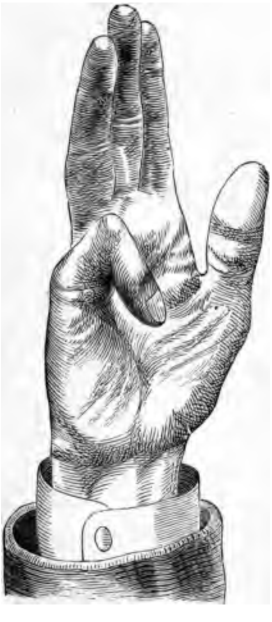

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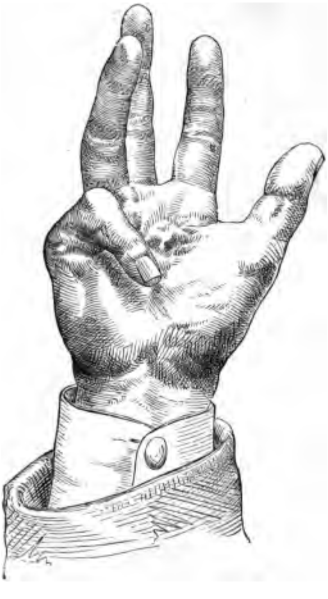


DESCRIPTION OF PLATE II.

Fig. 15.—Left hand of a barrister æt. 55, upon whom I operated in June, 1874, showing the successful result of treatment nearly two years afterwards. Taken from a cast. No cast or photograph was taken of this case previous to operation. The little finger was drawn down more than half way towards the palm of the hand, by a contracted band of palmar fascia along the outer margin of the first phalanx, and the external border of the hand, like that shown in Figs. 19 and 23. There was also a contraction between the first and second phalanges in the little finger. The ring finger was drawn down only to a moderate extent, by a contracted band of fascia leading to the transverse crease in the palm of the hand. The contraction in both fingers was increasing, and a source of much annoyance and inconvenience to the patient, who was a long time deterred from submitting to treatment by the adverse opinions given by several surgeons. The contraction of the little finger was attributed to a blow eight years previously, but he was a feeble dyspeptic man. He said he had not been subject to gout.

At the operation, assisted by Dr. Savage, who attended this gentleman, it was necessary to make four divisions of the palmar fascia, and the chief difficulty was to overcome the contraction between the first and second phalanges. However, both fingers were completely straightened at the time of operation, and in this case the immediate extension principle succeeded, the only apparatus employed being the splint represented in Fig. 6, and a small finger splint afterwards. The drawing Fig. 15 shows a little puckering of thickened skin still remaining at the transverse crease in the palm of the hand, but the fingers remained quite straight and the power of flexion had never been interfered with.

Fig. 16.—Right hand of a gentleman æt. about 55, upon whom I operated in April 1868, showing Dupuytren's contraction of the ring and little fingers, with a tense prominent cord leading from the angle between the fingers, to the central part of the palm of the hand. This was evidently formed by one of the four primary divisions of the palmar fascia, and its direction towards the angle between the middle and ring-fingers is explained by the digital prolongations on the opposed sides of these two fingers being specially involved in the contraction. I have observed this in many cases and mentioned it as diagnostic of the fascial origin of the contraction. If the prominent cord was formed by contracted tendon it would necessarily preserve its direction in the median line of the finger. The contraction between the first and second phalanges of the little finger was not severe. This gentleman had been engaged for many years as a merchant, and had not used this hand in any special manner. As to gout the case is the one alluded to in the text, page 21, as having an attack of gouty swelling of the hand three weeks after the operation; for this he was attended by the late Dr. Halley of Harley Street, who also assisted at the operation. This patient had, some years previously, suffered from gouty inflammation of the eye, but never had acute gout in the foot.

The contraction had existed several years, and was steadily increasing—especially in the ring-finger—so that the inconvenience was considerable. The fascial band and digital prolongations were divided in four places, and although the immediate extension principle could not be fully carried out in consequence of the contraction between the first and second phalanges of the little finger, the extension was made as rapidly as it could be borne by the patient, all the contraction being completely removed, without any loss in the power of flexing the fingers.

The drawing was taken from a photograph, but no photograph was taken of the case after treatment; the patient left town and I have not since seen him.

Fig. 17.—Right hand of a medical man æt. 45, showing an extreme degree of contraction in the little finger which had been operated upon by open-wound some years before he consulted me in 1863, the contracted fascia being, I believe, dissected out rather than simply divided. Re-contraction took place in an aggravated form as mentioned in the text, page 39, and as in all relapsed cases after open-wound the cicatricial contraction could not be overcome, and therefore the contraction between the first and second phalanges remained permanent, though somewhat improved by gradual mechanical extension. In this case, however, I divided a tense fascial cord in the palm of the hand, by which the first phalanx was drawn down, and this contributed so much to the improvement that he no longer wished to have the finger amputated, which he had first desired. Drawing taken from a cast.

Fig. 18.—Right hand of a gentleman æt. about 40, upon whom I operated in March 1868, showing an extreme degree of contraction of the little finger, the tip of which was nearly in contact with the palm of the hand. The second phalanx was drawn down to a right angle with the first, and the first phalanx was flexed upon the palm of the hand, by a fascial cord leading to the palm, and an external lateral band along the margin of the finger and outer border of the hand. The ring-finger was contracted only to a moderate extent, the first phalanx being drawn down by a fascial band towards the palm. The skin in the palm of the hand was thickened, dimpled, and corrugated. In this gentleman the little and ring-fingers in the left hand were also contracted but to a less extent, and I had operated upon these fingers successfully in 1867.

The little finger of the right hand was straightened with some difficulty by means of the finger instrument represented in Fig. 10, but was brought into a straight line with the metacarpal bone in seven weeks, the fascial bands having been divided in four or five places. This gentleman was decidedly of a gouty diathesis, and the contraction had been increasing for many years. I saw him again nine years after the treatment, a partial relapse of the contraction had taken place in the little finger only between the first and second phalanges, such as will occur in cases of great severity if not prevented by the patient wearing an extension splint at night. Drawing taken from a photograph.

PLATE III.

FIG. 19.

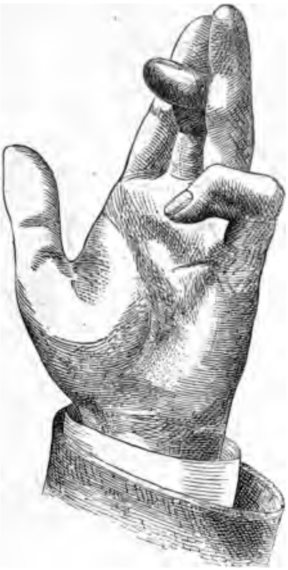


FIG. 20.

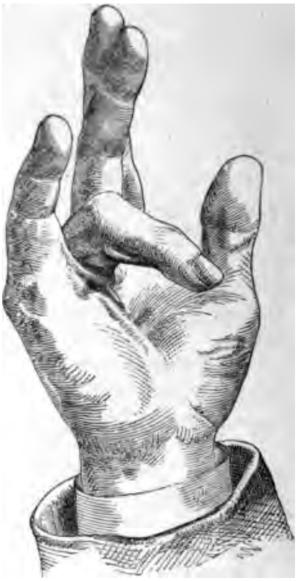


FIG. 21.

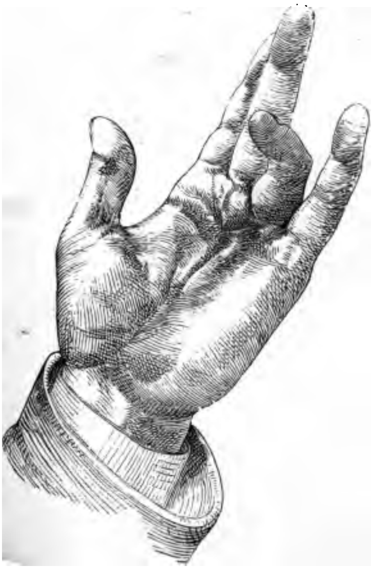
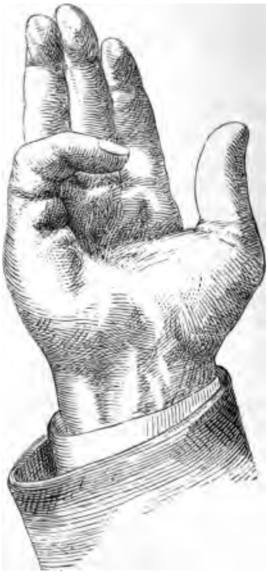


FIG. 22.



DESCRIPTION OF PLATE III.

Fig. 19.—Left hand of an officer in the army, æt. 46, upon whom I operated in March, 1863, showing a severe degree of contraction of the little finger between the first and second phalanges, the second phalanx being drawn down fully to a right angle with the first phalanx, without the first phalanx being at all drawn down towards the palm of the hand. The fascia was thickened and contracted along the palmar aspect of the finger, in the central part, and also along the outer border of the finger, from which a band extended along the external margin of the palm of the hand; but was not so prominent as in other cases in which the first phalanx is drawn towards the palm of the hand.

In this hand the second, or middle, finger was also contracted between the second and third phalanges, as shown in the drawing, and to a slight extent between the first and second phalanges. The first phalanx was not at all contracted or drawn towards the palm of the hand, and there was no evidence of contraction of the palmar fascia, *i.e.*, of any of the four primary divisions of the fascia in the palm of the hand, nor was there any thickening of the skin, or dimpled depression in the palm of the hand; the digital prolongations alone, between the first and second phalanges in the little finger, and between the second and third phalanges in the second finger, seemed to have been the seat of contraction—a rare form of the affection we are now describing.

In this gentleman the ring-finger of the right hand was also contracted, the second phalanx being bent upon the first, and the first phalanx drawn down towards the palm of the hand, by a fascial cord leading to the transverse crease in the palm, where a dimpled depression with some thickening of the skin existed.

The contraction in this case could not be explained by the hands having been used in any special manner, and although the patient had never suffered from regular gout, his medical attendant, the late Mr. Ince, considered him to suffer from gouty dyspepsia. The contraction of the little finger had commenced thirteen years ago, but had much increased of late years, and was a source of annoyance and inconvenience, interfering very much with the use of the gun and fishing-rod. The second finger had been contracted for several years, but was not a source of sufficient inconvenience to render operative treatment necessary.

In the operation on the little finger in March, 1863, at which Mr. Ince assisted, I divided the digital prolongations of the fascia in three places, when the contraction was overcome to about half its extent, and the finger afterwards straightened by the use of the finger instrument represented in Fig. 10. The finger remained straight, and with full power of flexion.

Four years afterwards this gentleman wished me to operate on the ring-finger of the right hand in consequence of the increase of the contraction which had taken place, the tip of this finger now almost touching the palm of the hand, and as an officer it interfered with the drawing of his sword.

I operated upon this finger in July, 1867, dividing the fascia in three places, viz.: the prominent cord near to the transverse crease in the palm of the hand, and the digital prolongations in the finger. The contraction between the first and second phalanges was too severe to yield to the immediate extension principle, and the finger instrument (Fig. 10,) was afterwards used. At this operation Dr. Protheroe Smith administered his new anæsthetic, the tetrachloride of carbon, the patient became very violent at the time, and was in bed for two days with bilious headache, and a little jaundiced. The subsequent progress was slow, but the finger was nearly straightened in two months, when treatment was interrupted by the patient leaving England on urgent military duties.

Eleven years afterwards, in 1868, I had the opportunity of again examining this gentleman, and found that partial relapse had taken place in both the fingers operated upon, but not to more than half the original extent, and further treatment will now probably be submitted to, with every chance of success.

In the ring-finger of the right hand, the first phalanx has remained in a straight line with the metacarpal bone, but the contraction between the first and second phalanges—which was never completely removed—had relapsed, so that the second phalanx is flexed nearly to a right angle with the first. At the time of operation the tip of this finger nearly touched the palm of the hand. In the little finger of the left hand the contraction had relapsed to about half the original extent, and the lateral fascial band on the outer side was tense and well defined.

This gentleman informed me that the phalangeal contraction of the second finger, as shown in the drawing, continued to increase, and four years ago he tore it open by hanging or holding on to the back of a coach whilst getting off. The finger was nearly straightened at the time of the accident; the wound healed favourably, but re-contraction afterwards took place, so that the finger became more bent than before the accident. It is doubtful how far an operation on this finger will be beneficial, though gradual mechanical extension may be of service. Drawing taken from a cast.

Fig. 20.—Right hand of an officer in the army, about 70 years of age, showing a severe degree of contraction in the ring-finger, to which the affection is almost limited; the little and middle fingers being only slightly contracted. A tense prominent cord, or fascial band, passed from the first phalanx towards the palm of the hand. No operation was performed in this case, although from the inconvenience and annoyance often occasioned by the contracted finger, this gentleman was anxious to have an operation performed, and this was arranged to be done; but was interfered with by frequent attacks of asthma, to which he is subject, and during these attacks the contracted finger is especially useful in enabling the patient to draw himself up in bed, by holding the head-rail of the bedstead, the time for treatment therefore could not well be given up. Drawing taken from a photograph.

Figs. 21 and 22.—Right and left hand of a medical man about 50 years of age, showing in the right hand a severe degree of contraction in the little finger, from which a prominent fascial cord passed towards the palm of the hand, the skin of which was puckered and thickened, and its cavity appeared to be deepened by some contraction of the other fingers, as well as the thumb, which was drawn towards the palm.

In the left hand the contraction was chiefly limited to the ring-finger, but extended in a moderate degree to the middle finger, the little finger not being at all involved. The skin in the palm of the hand was thrown into thick puckered folds, and the thumb was in some degree drawn towards the palm of the hand. This gentleman is of gouty diathesis, and the contraction, which had existed for many years, was steadily increasing. I commenced the treatment of this case by operating on the little finger of the right hand, but he was obliged to leave London for the North of England, where he resides, on the day of the operation, and as the immediate extension principle could not be fully carried out, the extension had to be made gradually by the instrument represented in Fig. 10. Although the treatment could not be carried out in this case in consequence of the pressure of professional engagements, there can be no doubt that the case, although one of great severity, is one admitting of further improvement. Drawings taken from photographs.

PLATE IV.

FIG. 23.

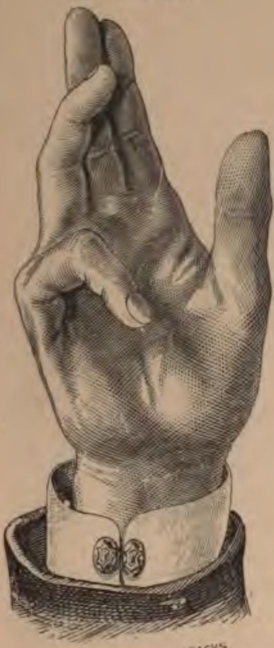


FIG. 24.

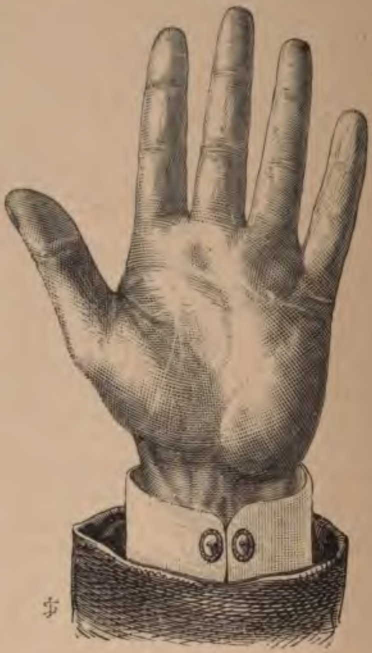


FIG. 25.

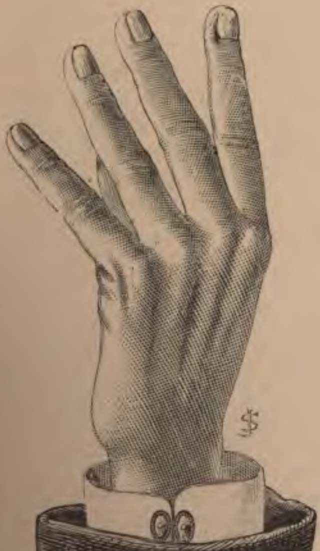
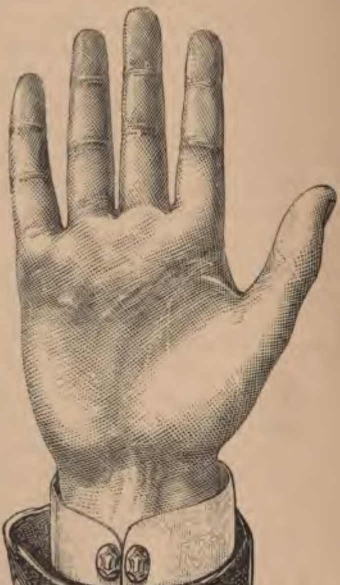


FIG. 26.



DESCRIPTION OF PLATE IV.

Fig. 23.—Right hand of a gentleman, æt. 33, upon whom I operated on the 31st of December, 1878, showing a severe degree of contraction of the little finger, and also contraction of the ring-finger, but to a less extent. In the little finger the second phalanx was flexed upon the first at a right angle, and the contraction was described as having commenced in a thickening in front of the first phalanx four or five years previously. The first phalanx was also drawn towards the palm of the hand by contraction of the digital prolongations of the fascia, and a sharp edge of a fascial band could be distinctly felt along the outer margin of the little finger and extending along the outer border of the palm of the hand. The contraction could not be attributed to the hand being used in any special manner, nor had this gentleman been subject to gout, unless the dyspepsia, to which he was especially subjected, was of gouty origin.

At the operation on this case, at which Sir James Paget, whom the patient had previously consulted, was present, the immediate extension principle could not be fully carried out. After the contracted fascial bands had been divided in four or five places, the finger could not be brought much more than half way towards the straight line with the metacarpal bones ; a small padded metal splint adapted to the curve of the finger was therefore applied, and on the fourth day gradual extension was commenced with the finger instrument represented in Fig. 10, as described at page 54. It took four weeks before the phalangeal contraction could be completely overcome, and even this rate of extension had to be slackened in consequence of the skin becoming thin, shiny, and attenuated. Drawing taken from a cast.

Fig. 24 represents the same hand as shown in Fig. 23, after one month's treatment. Both the little and ring-fingers were perfectly straight, and a little irregular thickening of the skin only remains over the fascial contraction in the palm of the hand.

Fig. 25.—Left hand of a gentleman æt. 36, upon whom I operated on the 31st of December, 1878—the same day as the case represented in Fig. 23—showing contraction of the middle, ring, and little fingers, which had commenced eight or ten years previously, and gradually increased in consequence of the thickening and contraction of the fascial bands in the palm of the hand, and their digital prolongations, drawing down the first phalanges in the fingers, without any contraction between the phalanges of the fingers, as shown in the previous case Fig. 23. This gentleman had by the advice of one of the many surgeons whom he had consulted been subjected to mercurial inunction until his system had become affected, and found that mechanical extension by an instrument similar to that represented in Fig. 7, caused pain, and seemed to aggravate the contraction, so that its use was discontinued.

In this case the contraction could not be explained by the hand having been used in any special manner, and although of a gouty diathesis he had not previously been subject to any attack of gout; but two months after the operation when he was only wearing a retentive metal splint at night, he had a sharp attack of gouty swelling of the entire hand, as described at page 21. This was accompanied with lithic acid urine, and yielded to the alkaline treatment.

At the time of operation, in which I was assisted by my friend Mr. Alfred Cooper whom he had previously consulted, four divisions of the contracted fascial bands were made, and the fingers completely yielded to the immediate extension treatment, the first phalanges of the three fingers being brought at once on a straight line with their metacarpal bones. No other apparatus was necessary than the padded metal splint represented in Fig. 6, and on the tenth day the drawing showing the fingers completely restored to their normal position was taken, as shown in Fig. 26. Fig. 25 was taken from a drawing made previous to operation.

Fig. 26 represents the same hand as shown in Fig. 25 in which the fingers were straightened completely at the time of operation. A little thickening of the skin, and dimpled depression alone remains at the seat of contraction in the palm of the hand at a point corresponding to the transverse crease. Drawing taken from a cast.

OBSERVATIONS

ON

CONTRACTION OF THE FINGERS.

(DUPUYTREN'S CONTRACTION.)

Contraction of the fingers takes place from a variety of causes, and the pathological conditions will be found to vary, according to the nature of the producing cause; such, for example, as local injuries, with laceration of tendons; deep abscesses in the palm of the hand; burn cicatrices; gout; rheumatic gout, &c.

I now propose to direct attention to one form only, viz., *Dupuytren's finger contraction*, commonly met with in men about the middle, or beyond the middle period of life—rarely at younger ages. I have never seen it in women.

The contraction may affect one finger alone, in which case, according to my observation, the ring-finger is most frequently drawn down towards the palm of the hand; some authors state that the contraction most frequently commences in the little finger; having commenced in one finger, however, the adjacent fingers are in most cases gradually drawn down, though to a less extent. I have frequently seen the ring-finger severely contracted, so that its tip would nearly touch the palm of the hand, and the middle and little fingers contracted to about half this extent. I have seen the contraction in many cases limited to the little finger. The index finger and the thumb usually escape. I have never seen them more than slightly contracted, as shown in Figs. 16, 21, and 22.

M. G. Goyrand, of Aix, records one case in which the thumb was contracted in the right hand of a man aged 72, who died of apoplexy, at Aix, in November 1834, and in whom Dupuytren's contraction existed in both hands, several fingers being drawn down in each hand.* M. Goyrand dissected the hands in this case, and has carefully recorded the appearances met with, which will be hereafter referred to.

I have now under my observation the case of a medical man in whom both thumbs are contracted in a marked degree, and the three outer fingers on each hand also contracted, but not severely; the skin on the palm of each hand is thickened, nodulated, and puckered by adhesion with palmar fascia.

When the contraction commences in the little finger, the ring-finger in some cases does not become involved, and the contraction being limited to the little finger, is explained by its dependence, in most cases, upon the contraction of a band of fascia extending along the outer margin of the finger from the outer border of the palm of the hand, as shown in Figs. 1, 2, and 3, and not upon the contraction of one of the four primary divisions of the fascia in the palm of the hand.

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* "De la rétraction permanente des doigts; nouvelles recherches sur la nature, les causes et le traitement prophylactique et curatif de cette infirmité," par le Docteur G. Goyrand, d'Aix. "Gazette Médicale de Paris," 1835. Tome III., p. 481.

In these contracted fingers the articulations are generally in a healthy condition, though in some cases they are enlarged and altered in form, by rheumatic gout. The joints, however, can be flexed freely, but any attempt at extension is painful from the resistance offered, in severe cases, by a tense contracted cord passing from the finger into the palm of the hand, and to which the skin of the palm is closely adherent. The skin in the palm of the hand, near to the base of the contracted fingers is commonly drawn into thick knotty folds.

PATHOLOGY.

Dupuytren's account and his dissection.—The pathology and treatment of this form of finger-contraction always has been, and still is, the subject of much difference of opinion, and Dupuytren appears to have been the first surgeon to investigate the anatomical conditions by dissection. In his "Leçons orales de Clinique Chirurgicale"* it is stated, "A man who for some time had been under the observation of M. Dupuytren, and was the subject of this deformity, died, and M. Dupuytren succeeded in gaining possession of the arm and hand. A careful drawing was made of the parts before the dissection. The whole of the skin was removed from the palm of the hand, as well as from the palmar surface of the fingers. The result was the complete disappearance from it of the folds into which it had been gathered. This opening out showed that its arrangement during the disease was communicated to it; but in what way or by what means was not evident. Continuing the dissection, the professor exposed the palmar aponeurosis, and was surprised to find it stretched, retracted, and shortened. From its inferior part were given off bands which passed to the sides of the affected finger. On making movements of extension in the affected fingers, M. Dupuytren observed that the aponeurosis underwent a kind of stretching and crackling. This threw light on the subject. It seemed clear that the aponeurosis was somehow connected with the deformity produced by the disease. The affected point remained to be discovered. The prolongations to the sides of the fingers were then divided; the contraction disappeared at once, and the fingers assumed their normal condition of one third flexion. The smallest force was now sufficient to bring them into a state of complete extension. The tendons were not implicated in any way, and their sheaths had not been opened. All that had been done was the removal of the skin, and the division of the bands of aponeurosis going to the bases of the phalanges.

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* "Leçons orales de Clinique Chirurgicale faites à l'Hôtel Dieu de Paris," par M. le Baron Dupuytren, recueillies et publiées par une Société de Médecins. Tome premier, Bruxelles, 1832, p. 5, article premier. "Rétraction permanente des Doigts par suite d'une affection de l'aponeurose palmaire."—An abstract of Dupuytren's observations will be found in "Selections from the Clinical Lectures delivered at the Hôtel Dieu, Paris, in the session 1831 and 1832, by Baron Dupuytren," *London Medical and Surgical Journal*, Vol. I., page 267, London, 1832, Renshaw and Rust.

"In order to remove all doubt and objections, M. Dupuytren dissected out the tendons. They retained their natural volume and mobility, as well as the smoothness of their surfaces. Continuing the examination, it was found that the articulations were in their natural condition, the bones not enlarged, roughened, or presenting in any way, either internally or externally, the smallest degree of change. No alteration was observed in the apposition of the articular surfaces, nor in their external ligaments no anchylosis. Nor had the synovial sheaths, or the cartilages, or the synovial membranes undergone the slightest change. The conclusion naturally arrived at from these conditions, was that the starting point of the disease was the excessive tension of the palmar aponeurosis. As regards the cause of the palmar lesion, it was considered to result from injury to the aponeurosis caused by the too violent, or too prolonged action of some hard body held in the palm of the hand."

Since Dupuytren made this important contribution to our knowledge of this affection, in the year 1832, it has sometimes been spoken of as Dupuytren's finger-contraction, a title as useful, as it is also a just compliment to the great surgeon, distinguishing it from all other forms of finger-contraction.

Goyrand's account and his dissection.—M. G. Goyrand,* of Aix, also records the dissection of the hands of a man 72 years of age, who died of apoplexy in the year 1834, affected with this form of finger-contraction, and the description agrees very closely with that of Dupuytren, especially as to the tendons and their sheaths not being implicated in the contraction. M. Goyrand, however, regards the lateral bands extending along the phalanges, not as digital prolongations of the palmar fascia, but abnormal fibrous fasciculi, which extend from the fascia to the sheaths of the flexor tendons and the sides of the phalanges, into which they are inserted by their inferior extremities, extending sometimes from the first to the second phalanx. He also describes transverse fasciculi connecting the longitudinal bands; and considers Dupuytren's opinion, that the palmar fascia alone was the cause of the contraction, was erroneous.

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* "Gazette Médicale de Paris," 1835, p. 481; also "Mémoires de l'Académie Royale de Médecine," Tome III.; and "Gazette Médicale," 1834, p. 219.

Partridge's dissection in King's College Museum.—In the Museum of King's College, is a dissected specimen of one of these finger-contractions, No.

FIG. 1.

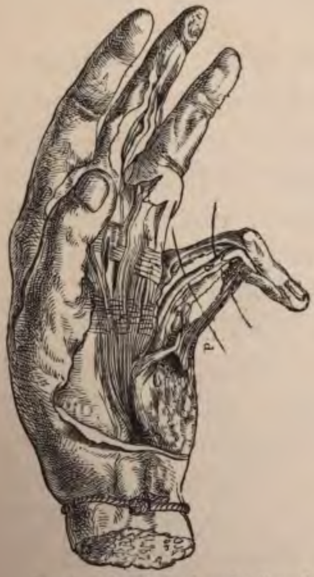


FIG. 2.

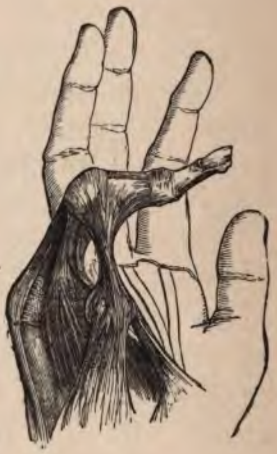


Fig. 1.—Dissection of contraction of little finger, showing contraction to depend upon the Palmar Fascia alone; from specimen in Museum of King's College. *a*. Contracted Band of Palmar Fascia stretching across like string of the bow; *b*. Flexor Tendons lying deeply along the concavity of the curve, close to the bones.

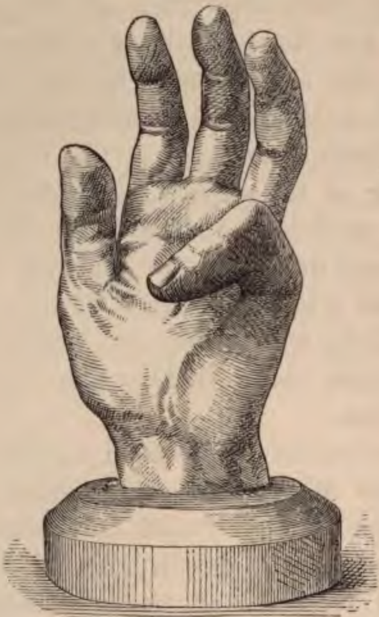
Fig. 2.—Another view of same dissection as Fig. 1, showing contraction to depend upon a band of the Palmar Fascia. (From Druitt's *Surgeon's Vade Mecum*. Eleventh Edition, Fig. 301. J. & A. Churchill. London, 1878.)

1444-3, presented by the late Professor Partridge, (see Figs. 1 and 2). In this specimen the contraction is limited to the little finger, and shown to depend upon a strong contracted band of the palmar fascia *a*, by which the finger is drawn towards the palm of the hand, the fascial band stretching across, like the string of a bow, and passing along the outer side of the little finger, along the first phalanx, to the beginning of the second. The flexor tendons *b*, Fig. 1, are in no degree implicated in the contraction, and may be seen deeply in the concavity of the curve in their normal relation to the bone, *i.e.*, in the dense tubular sheath by which they are closely bound down to the phalanges, along their entire length, between the articulations.

This dissection has also been figured in Druitt's *Surgeon's Vade Mecum*, eleventh edition, p. 301, and I am indebted to Dr. Druitt for permission to reproduce it here (see Fig. 2). In this drawing, the direction and relations of the contracted band of the palmar fascia are more distinctly shown, but the relation of the fascia to the tendons had not then been demonstrated by dissection. I improved the dissection to this extent at the time when permission was given me by the Museum Committee, in October 1877, to examine the specimen and have the present drawing made. In Dr. Druitt's woodcut the artist has failed to reverse the drawing on the block, so that it has the appearance of being drawn from a right hand; but the dissection and the cast both show it to be the left.

There is also a cast in the Museum (see Fig. 3), apparently taken from the same subject previous to the dissection, as it corresponds in all respects with the contraction of the little finger, and shows the lateral direction of the contracted fascial band. This cast has no number, but is engraved June, 1853, and I am informed by Mr. Barnard, the curator of the Museum, that Mr. Partridge always used it in lecture, together with the dissection.

FIG. 3.



Cast from Hand represented in Figs. 1 and 2, previous to dissection in Museum of King's College.

Dissection in Museum of St. Bartholomew's Hospital.—In the Museum of St. Bartholomew's Hospital there is also a dissected specimen of Dupuytren's finger-contraction affecting the middle and ring-fingers (Series 5, No. 5-23). In the catalogue,* this specimen is described as "part of a hand in which the middle and ring-fingers were permanently flexed, in consequence of the thickening and contraction of the portions of the palmar fascia connected with them." I am indebted to my friend, Mr. James Shuter, for directing my attention to this specimen, the existence of which I was not previously aware of. A very accurate drawing has been made by Mr. Godart, the artist to the hospital, and is represented in Fig 4.

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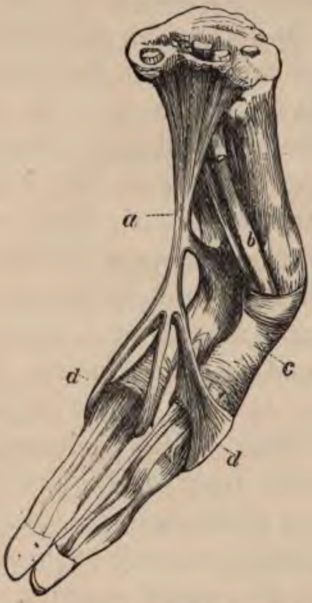
* "Descriptive Catalogue of the Anatomical Museum of St. Bartholomew's Hospital." Vol. I., p. 192. London: Churchill, 1846.

FIG. 4.



Dissection of Finger Contraction, affecting middle and ring fingers, showing contraction to depend upon the Palmar Fascia alone; from specimen in St. Bartholomew's Hospital Museum. *a*. Contracted band of Palmar Fascia stretching across like string of a bow; *b*. Flexor Tendons lying deeply along the concavity of the curve, close to the bones, and bound down along the first phalanges of the fingers by the dense tubular sheath *c*, through which they pass. *d*. Digital prolongations of Palmar Fascia, extending to articulation between first and second phalanges in each finger.

In this specimen the palmar fascia is seen as a firm, tense, prominent cord *a*, stretching, like the string of a bow, between the palm of the hand and the contracted fingers, whilst the flexor tendons *b*, are seen lying at a depth, and pursuing their natural course along the concavity of the curve in close proximity with the bones, and over the first phalanx bound down by the dense tubular sheath *c*, which they enter opposite the metacarpo-phalangeal articulations. The digital prolongations of the palmar fascia *d*, in this specimen, and also in the specimen in King's College Museum (see Figs. 1 and 2), appear to have been dissected away from their attachment to the bone along the lateral margin of the first phalanx, and thus made to appear to have their insertion on either side of the articulation between the first and second phalanges of the fingers. In both these preparations, therefore, the digital prolongations of the palmar fascia appear to flex the fingers and draw them towards the palm of the hand, by acting upon the articulation between the first and second phalanges, which does not correspond anatomically to their normal insertion; but I imagine this arises from their normal insertion along the margins of the first phalanx having been dissected away, and the insertion of these digital prolongations therefore, apparently, carried further down the fingers than they would be in their natural condition, although the digital prolongations may be traced beyond the articulation on to the second phalanx.

In the St. Bartholomew's specimen, it is specially worthy of remark that in both contracted fingers the second and third phalanges remain in a line, continuous with that of the first phalanx, which alone is flexed towards the palm of the hand, *i.e.*, the second phalanx is not bent upon the first, or any angle of flexion formed between the first and second phalanges. It is evident, therefore, in this case, a division of the contracted fascia would immediately have restored these fingers to their normally straight line with the metacarpal bones. Whilst on the other hand, in the King's College specimen, the little finger is drawn down, not only by the flexion of the first phalanx, but the second phalanx is bent upon the first, so that a sharp angle of flexion is formed at the articulation between the first and second phalanges. This seems to be caused by the contraction of some fibres of the digital prolongations of the fascia, extending laterally from the first to the second phalanx, and thickened in the neighbourhood of the joint.

Practically, I have found this, in some cases, a very difficult condition to overcome, and some degree of contraction of the fingers between the first and second phalanges will remain, and require separate after-treatment, after the flexion of the first phalanx has been completely restored to a straight line with the metacarpal bone.

The Author's case, in which the parts were exposed by accident.—It has never occurred to me to have the opportunity of dissecting one of these finger contractions ; but on the 15th of April, 1864, a gentleman, Mr. L., æt. 50, residing at Hampton Court, who suffered from Dupuytren's contraction of the fourth and fifth fingers in each hand, and upon whom I had proposed to operate, met with an accident. In attempting to hold a restive horse, the contracted fingers on the right hand were suddenly torn open, and the skin in the palm of the hand torn across. I saw him shortly after the accident, when the hand had been merely tied up by a handkerchief, and found a large gaping wound in the palm of the hand, reaching nearly half way across. The palmar fascia had been torn across, together with the skin, but the sheaths of the tendons were not torn, and it was evident that these structures had not been implicated in the contraction. The tendons in their sheaths were seen lying at a depth from the surface, running along the concavity of the curve, in proximity with the bones, whilst the fascia had evidently been stretched across like the string of a bow. After cutting away a few torn threads of fascia, I found, on attempting to extend the fingers, that the previously transverse wound assumed a lozenge-shape in a perpendicular direction. I therefore approximated the edges laterally and introduced sutures, so that when sewn up it resembled a longitudinal instead of a transverse wound. The hand was firmly bound round with narrow strips of plaster, and bandaged to a splint with the fingers in an extended position. On the third day the wound presented a healthy appearance, without any suppuration, and I therefore removed the sutures. The healing process proceeded without interruption, and the fingers remained nearly straight, without their power of flexion being lost.

These, so far as I know, are the only facts we can appeal to for the anatomical conditions presented in Dupuytren's finger-contraction; and they all agree in negativing the supposition that the tendons, or sheaths of the tendons, are involved in these contractions. This is also confirmed by my own clinical experience, as I have invariably found that after dividing subcutaneously a tense and prominent cord —which has generally been mistaken for a tendon— in the palm of the hand, the patient is able to flex the finger as strongly as before the operation, at once disproving the opinion often expressed by surgeons, that such fingers will remain stiff and inflexible after the operation. A gentleman, Captain L., upon whom I operated some years ago, was well known as a good flute player, and within a few months of the operation, which was completely successful in straightening the ring-finger, he was enabled to play the flute as well as ever.

The late Sir William Fergusson, in the last edition of his "System of Practical Surgery,"* gives at page 259, a drawing (Fig. 135) of the particular form of finger-contraction we are now describing, and observes: "At first sight, in such a case as this, (well displayed in the drawing) the flexor tendons seem to be the cause of this distortion." After alluding to the opinions of Goyrand and Dupuytren to disprove this, he states: "In all instances where the contraction has been extreme, it has appeared to me that the skin, cellular tissue, fascia, and even tendons, have been more or less in such a state of permanent rigidity as to prevent the extension of the fingers; indeed, I have observed in the dissecting-room, that in cases of old standing, when all the textures were removed, with the exception of the ligaments, the fingers could not even then be stretched out without force, and that they immediately afterwards, unless when the ligaments were torn, resumed their crooked position. In some cases, I believe that one or other of the textures above named may be more in fault than the rest, and in others, that even the lumbricales and interossei are in part the cause."

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* "A System of Practical Surgery," by Sir William Fergusson, Bart. Fifth Edition. London: Churchill, 1870.

Anatomical impossibility of the flexor tendons being involved in the contraction.—The impossibility of the flexor tendons being involved in Dupuytren's contraction of the fingers, will, I think, become apparent to any surgeon after an attentive examination of the anatomical relations of the flexor tendons to the fascia, and to the bones at the parts where the most prominent contracted cords usually exist, viz.: *first*, in the palm of the hand, at a spot corresponding to the transverse flexion-furrow, where the most tense and prominent solitary cord generally exists, as shown in Figs. 11, 13, and others; and *secondly* in the neighbourhood of the cutaneous webb between the fingers, where the smaller, but very resisting contracted bands of fascia are always met with, and are directed towards the sides of the phalanges. At these two spots, we have then particularly to study the anatomical relations of the flexor tendons to the fascia, and to the bones.

First with regard to the transverse flexion-furrow in the palm of the hand—by this I mean a transverse crease, which on flexion of the fingers is converted into a deep furrow, passing transversely across the palm of the hand, rather more than an inch above the margin of the cutaneous webb between the fingers. This transverse crease, or furrow, is no doubt produced by the habitual flexion of the fingers upon the palm of the hand, and will be found to be more conspicuous in proportion to the hand-labour performed. It will also be observed that in many persons, especially those less accustomed to manual labour, the flexion-furrow of the index finger curves upwards towards the central part of the palm of the hand, whilst the flexion-furrow belonging to the three outer fingers curves downwards towards the cutaneous webb between the index and middle fingers; the deviation from the continuous transverse line is no doubt due to the more independent habitual flexion of the index finger.

The main point, however, in reference to our present subject, is that this transverse crease, or flexion-furrow precisely corresponds to the metacarpo-phalangeal articulations, and that if a needle were entered at this transverse furrow on the palmar aspect, it would, in transfixing the hand, pass through the metacarpo-phalangeal articulation.

Now, we know, as an anatomical fact, that the flexor tendons of the fingers enter their dense tubular sheath on the palmar aspect of the first phalanx, just at the margin of the metacarpo-phalangeal articulation, as well shown in Fig. 4, *b* and *c*, from preparation in St. Bartholomew's Hospital Museum, and continue their course along the finger in close proximity with the bone, so that a needle transfixing the hand from the transverse flexion-furrow in the palm, very closely indicates the spot at which the flexor tendons enter their dense tubular sheath. From this dense tubular sheath no anatomist would believe the flexor tendons could be dislodged by any traction-power exerted by contraction of the palmar fascia, yet the spot at which the tendons enter the sheath also corresponds to the most prominent part of the large solitary contracted cord observed in the palm of the hand marked *a* in Fig. 4, and it will be seen that no such displacement has occurred in the case represented.

Reasoning, therefore, from these anatomical facts, we could only conclude that the tense solitary cord in the palm of the hand must be one of the four large sub-divisions of the palmar fascia into which it divides, and which pass towards the four outer fingers, as far as the metacarpo-phalangeal articulations ; and it is therefore impossible that the flexor tendons of the fingers could be reached, or divided, by the surgeon when he divides the tense solitary cord in the palm of the hand.

Secondly.—Opposite the metacarpo-phalangeal articulations, the four great sub-divisions of the palmar fascia are connected by transverse bands, and then they subdivide into the digital prolongations, which pass on either side of each finger towards their insertion into the bone of the first phalanx, external to, and along the margins of the dense tubular sheath enclosing the flexor tendons.

The insertion of the digital prolongations of the fascia into the periosteum of the first phalanx is not accurately described in many anatomical works, the insertion into the sheaths of the tendons being more generally recognized. Professor Curnow, of King's College, is in the habit of directing the attention of his class especially to the insertion of the digital prolongations of the palmar fascia into the periosteum of the first phalanx, external to, and along the borders of the sheath of the flexor tendons.

I have satisfied myself of the accuracy of this by my own dissection, and have seen it admirably displayed in the dissections used by Dr. Curnow.

It appears to me that the drawing down of the first phalanx is the more readily explained when the insertion of the digital prolongations of the fascia into the periosteum is borne in mind.

It will thus be seen that above and below the transverse flexion-furrow in the palm of the hand, we have important differences in the anatomical arrangement of the palmar fascia; above this line we have the four great sub-divisions of the palmar fascia, proceeding centrally towards the four outer fingers; and below the line towards the fingers we have the digital prolongations of the fascia proceeding laterally to the sides of the phalanges.

The tense solitary cord frequently seen above the transverse flexion-furrow, and represented in Figs. 9 and 11, might well, from its situation, direction, and thickness, be mistaken for one of the flexor tendons, and in my earlier operations I divided it in the belief that it was a tendon, or at least that the tendon and its sheath, as well as the palmar fascia, were involved in, and contributed to form the tense contracted cord. The after-treatment, by gradual mechanical extension, was also based upon this supposition, which I have now satisfactorily proved to have been erroneous. It was the conviction of this error which led me to abandon the method of gradual mechanical extension, and adopt the plan of immediate extension advocated in the present paper.

Origin and Progress of the Contraction.—The commencement of this form of contraction is sometimes to be traced in one hand in patients in whom the contraction exists in a severe form in the other, and I have watched its commencement from a flattened nodular induration of the palmar fascia, in, or just above the transverse crease in the palm of the hand, corresponding to the metacarpo-phalangeal articulation. In the beginning, the skin is not adherent to this flattened induration; but in one case, now under my observation, the commencement of a fascial cord-contraction can be traced, leading from the transverse crease to the little finger in the left hand, a spot certainly not exposed to pressure.

In the *second* stage the skin becomes adherent to the thickened fascia, and a puckered dimple is produced, extending from which, towards the finger, a thickened band of fascia can be distinctly felt.

The *third* stage consists of an increased thickening of the palmar fascia, and the band leading to the finger, and also the formation of a thick cord-like band of fascia, leading from the central thickening towards the annular ligament of the wrist, accompanied with a gradually increasing drawing down of the finger, or fingers, towards the palm of the hand. Such I believe to be the gradual progress of the fascial contraction and its adhesion to the skin, in the great majority of cases of Dupuytren's finger-contraction.

In some cases, and especially those in which the second phalanx is sharply flexed upon the first, the contraction appears to commence in thickening of the digital prolongations of the palmar fascia along the first phalanx. Patients describe the commencement as apparently thickening induration of the skin over the first phalanx; they also then describe the second phalanx as becoming flexed upon the first, and last of all the finger being drawn down to the palm of the hand, often somewhat rapidly, so that the tip of the finger may touch the palm of the hand in about two years. In these cases, therefore, the extension of the thickening of the digital prolongations of the fascia would appear to extend downwards from the first to the second phalanx, and lastly upwards to the larger fascial bands in the palm of the hand. In a few cases I have seen the contraction between the first and second phalanges, without any marked thickening or contraction in the hand.

CAUSE, *Local and Constitutional.*—With regard to the cause of this affection, most authorities agree in assigning it, in the great majority of cases, to a local cause, and believe it to be produced by pressure from the tools employed in various occupations; and it is said that carpenters, gardeners, and gunners are specially liable to it. Sir James Paget* refers to the elder men occupied in wire-drawing, and lock and key making, as being subject to this condition. It is also thought that rowing, pressure from the whip-handle in driving, and other causes of local irritation might produce it.

Sir William Fergusson† observes: "It has been asserted that those who are so employed as to cause much pressure on the palm of the hand (such as carpenters, gardeners, gunners, &c.) are more subject to this condition than others; it may be so, but the figure above exhibited (Fig. 135, a good illustration of Dupuytren's contraction affecting the ring and little fingers, W. A.) was from an individual who had been less occupied in this way than most people, and I have again and again seen the fingers thus distorted in parties who never had occasion to put their hands to any kind of rough work."

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* *British Medical Journal,* 1875, Vol. I., p. 666.

† *Op. cit.,* p. 259.

It is also generally admitted that this form of contraction may take place from constitutional causes, independently of any local cause, and that it is then generally traceable to a gouty diathesis. Sir James Paget, in the clinical lecture above referred to.* points out the dependence of this contraction in some cases upon the gouty diathesis, and believes that the adhesion of the palmar fascia to the adjacent sheaths of tendons, and the integuments, forms a point of diagnosis. My own opinion is, that it always depends upon a constitutional, rather than any local cause, and essentially I regard it as depending upon a gouty diathesis.

In the cases which have fallen under my observation there have been generally other manifestations of a gouty tendency, more especially to that form we recognise as rheumatic gout, affecting several articulations, and often causing enlargement of the joints of the fingers, rather than true inflammatory gout affecting the great toe. In the majority of cases, we are able to trace a well-marked family history of gout, although the patients suffering from contraction of the finger, in many instances, have not themselves suffered from gout in any form; unless this affection is to be regarded amongst the minor manifestations of gout so ably described by Sir James

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* Abstract of Clinical Lectures "On the Minor Signs of Gout in the Hands and Feet," delivered at St. Bartholomew's Hospital. *British Medical Journal*, 1875, Vol. I., p. 666.

Paget in one of his clinical lectures "On Gout in some of its Surgical Relations," and more especially in Lecture II., "On the Minor Signs of Gout in the Hands and Feet."*

It is also worthy of remark that in two instances, patients upon whom I have operated for contracted fingers—cases represented in Figs. 16 and 25—had both an attack of gouty swelling of the hands. The gentleman whose case is represented in Fig. 16 had an attack of gouty swelling of the hand three weeks after the operation, towards the end of treatment, when the finger was nearly straightened. He had not a family history of gout, and, at first, said he had never suffered from gout, but afterwards remembered he had suffered from severe and painful inflammation of one eye, which the oculist told him was of a gouty character. In the other case, represented in Fig. 25, a sharp attack of gouty swelling of the entire hand occurred two months after the operation, when the cure was complete. Indeed, in this case, as the contraction was entirely overcome at the time of operation, and the immediate extension principle succeeded, no after mechanical treatment was necessary beyond the application of a retentive metal splint.

In one of the cases also mentioned by Mr. Cæsar Hawkins, a coachman, æt. 39, with finger contraction in both hands, Mr. Hawkins was obliged to defer the operation in consequence of the patient being attacked with gouty inflammation in several joints successively.

In favour of this opinion, that the finger-contraction depends upon constitutional rather than local causes, I would refer; *First*, to the class of patients in whom it occurs. During a connexion of more than twenty years with the Royal Orthopædic Hospital, I have seen but very few cases of Dupuytren's contraction in the labouring class, and have failed to obtain evidence of its frequent occurrence amongst any particular class of mechanics; whilst the cases that did present themselves, generally occurred in butlers, and in-door servants.

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* *British Medical Journal*, 1875, Vol. I., p. 665.

It seems, however, to be an affection of common occurrence in the middle and upper classes of society. The cases which have fallen under my observation have generally occurred in clergymen, barristers, medical men, officers in the army and navy, and merchants; the only condition common to a great majority of the cases being a disposition to gout, co-existing with the finger-contraction.

Secondly.—I would refer to the frequent occurrence of this affection in the left hand only, and to its occurrence in both hands, which we could hardly explain by any local cause.

Thirdly.—I would refer to the fact that in several instances I have known two brothers suffer from it, and in some cases the father and son, and in one instance three generations have been similarly affected, illustrating its hereditary tendency. For these reasons I am disposed to attach far greater importance to the constitutional, than any local cause.

TREATMENT.

With regard to the treatment, this must be either mechanical, or operative, and although operative treatment is always required in severe cases, there can be no doubt that gradual mechanical extension, by an apparatus worn night and day, would not only prevent increase of the contraction, but diminish, and possibly even cure it when slight, and not of long duration.

GRADUAL MECHANICAL EXTENSION.

When the cure of this affection is attempted by the process of gradual mechanical extension, the extending force should be lightly applied, and constant, not intermittant. When patients have endeavoured to overcome the contraction by wearing a steel instrument along the back of the hand and finger, only at night, they frequently complain not only of the pain occasioned by the extension, and the painful stiffness remaining the next day, but also state that the contraction appeared to increase afterwards, and under the belief that the extension aggravated the contraction it has frequently been abandoned.

If, however, the extending force be lightly and constantly applied day and night for several months, as my late colleague, Mr. Tamplin, used to apply it, there can be no doubt the contraction may, in many cases, be overcome. But in severe cases, and in those of long standing, mechanical treatment is useless, and by causing pain often appears to aggravate the contraction; the only prospect either of benefit or cure being from operative treatment, either by open-wound, or the subcutaneous method.

OPERATIONS BY OPEN WOUND.

Dupuytren's Operation.—Dupuytren, in the year 1831, divided the contracted palmar fascia by open-wound, making an incision ten lines in length, and in his "Leçons orales,"* the following observations are made, describing the case first operated upon by him.

"The various theories set forth as to the etiology of this distortion, have necessarily given rise to much uncertainty as regards modes of treatment. Many surgeons have believed the disease to be beyond the resources of their art. Dr. Bennati consulted Astley Cooper in the case of an Italian named Ferrari, the subject of this deformity, and was told by this celebrated English surgeon that the deformity was incurable; other surgeons, who admitted its curability, laid down rules of treatment which proved inefficacious. M. Dupuytren, in treating several cases of contraction of the ring-finger, has employed one after the other atomised fumigations, emollient to begin with, and afterwards soothing. Plasters applied during the day-time, and sometimes at night, leeches, friction with absorbent ointments, especially mercurial ointment and calomel. In addition to these means he has resorted to the use of alkaline, simple, sulphurous, and saponaceous douches, administered at various temperatures, without obtaining any results. As a last resource, M. Dupuytren ordered Lacroix to make an instrument by which permanent extension might be secured. However, no amelioration was produced by the instrument; on the contrary, it caused such intense pain in the palm of the hand, when the extension was kept up too long, that its use was abandoned. Some surgeons proposed division of the flexor tendons. This operation has been performed twice. The result in one case was inflammation and mortification along the sheath; the patient's life was endangered, and the finger remained flexed. In the other case the division was practised lower down; no complications arose, but it remained flexed as before. Some time after these operations had been performed, and by excellent surgeons, Dupuytren was consulted in a similar case by Dr. Mailly*. . . . The operation was performed June 12th, 1831, assisted by M.M. Mailly and Marc, in the following manner. The hand of the patient being firmly fixed, he (Dupuytren) commenced by making a transverse incision, ten lines in length, opposite the metacarpo-phalangeal articulation of the ring-finger, the bistoury divided first the skin, then the palmar aponeurosis with a crackling noise audible to the ear. The incision completed, the ring-finger straightened, and was as easily extended as in the natural state. Wishing to spare the patient the pain of a fresh incision, Dupuytren endeavoured to extend the section of the aponeurosis by gliding the knife transversely, and deeply, under the skin towards the cubital (thumb) border of the hand to accomplish the disengagement of the little finger, but in vain; he was only able to partially extend the incision of the aponeurosis. Consequently, he determined to make a fresh transverse incision opposite the articulation of the first and second phalanges of the little finger, and thus detached its extremity from the palm of the hand, but the rest of the finger remained flexed towards this part. He then divided the skin from the aponeurosis by a fresh incision, opposite the articulation of the corresponding metacarpo-phalangeal joint. This produced a slight relaxation, but its effects were incomplete. At length a third, and last, incision was made transversely, opposite the middle of the first phalangeal joint, and the little finger was at once able to be extended with the greatest ease. This result distinctly showed that the last incision had divided the point of insertion of the aponeurotic digitation. Very little blood was lost by these incisions, and was stopped by dry charpie; the ring and little fingers were placed in extension by the aid of an appropriate instrument fixed on the back of the hand. The day of the operation, and the following night, there was little or no pain. Only slight inconvenience was caused by the continual extension. The following morning the back of the hand was slightly swollen, the result of the compression of the instrument, which was constructed rather clumsily, and by an unskilful maker. On the morning of the 14th a new instrument of M. Lecroix, consisting of a half-cylinder of cardboard terminated by four metallic ends, which could be lengthened or shortened at will, and mounted by a kind of thimble to embrace the ends of the fingers was applied. The patient appeared at first to experience relief, but in the evening the irritation re-appeared, the pain re-doubled, and the hand was invaded by a universal swelling. Then, without removing the extension instrument, Dupuytren ordered the hand to be continually irrigated with a solution of cold water and acetate of lead. Under the influence of these frequent ablutions, the pain and tension diminished, and the condition of the patient became more endurable.

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* "Leçons orales," par M. le Baron Dupuytren. Tome I, p. 3. Bruxelles, 1832.

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* *Op. cit.*, p. 8.

"On the 15th the charpie was removed and suppuration was commencing. The hand was still engorged, and there was a painful tension felt throughout the extent of the extended fingers. The extension was maintained to the same degree, and the lead lotions continued. On the 16th there was only slight swelling of the hand, and stiffness in the fingers. Suppuration was completely established. On the 17th the symptoms had diminished in intensity, and the extension of the fingers was able to be increased several degrees without causing pain. Finally, on the following days, the swelling and tension disappeared, and the edges of the wound commenced to cicatrize, slowly, indeed, on account of the separation produced between their lips by the forced position in which the hand was purposely maintained. Nevertheless, by the 2nd of July cicatrization was complete. The manner in which it occurred deserves notice, it followed a progression *pari passu*, with the different degree which the extension exercised on each of them. Thus one saw successively heal *first*, that wound which corresponded to the articulation of the first and second phalanges of the ring-finger: *secondly*, the wound opposite the middle part of the first phalanx; *thirdly*, the wound in relation to the articulation of the metacarpo-phalangeal joint of the little finger; *fourth*, and lastly, the wound which had been first made, and which corresponded to the metacarpo-phalangeal articulation of the ring-finger. Moreover, the patient retained the use of the extension instrument for more than a month in order to prevent the re-union of the borders of the divided aponeurosis, and to obtain isolated cicatrization. When the instrument was removed, the patient could easily flex the fingers, and was only inconvenienced by the stiffness resulting from the continued extension of the joints. This stiffness disappeared as soon as the patient was permitted free movements of his hand. On the 2nd of August Mr. L. only wore the extension instrument at night, and the joints already began to enjoy freedom of movement, which inclines one to think that the use of the flexor tendons had remained intact, and that in a short time the natural movements of the fingers would be restored.

"The above case leaves no doubt as to the cause of the disease; the opinion of Dupuytren is then the only correct one, and the one which rightly interprets the existing conditions. But how could the palmar aponeurosis cause the above results? A short description of this fibrous envelope will explain it. The palmar aponeurosis, in its superficial part, arises from the opening out of the tendon of the palm, and the prolongation of the anterior ring ligament of the carpus. At first very strong at its origin, it gradually diminishes as it advances, so that it gives rise towards its inferior border to four large fibrous bands directed towards the lower extremity of the last four metacarpal bones. There each of these bands bifurcates for the passage of the flexor tendons, and each of the branches of this bifurcation is inserted on the *side of the phalanx*, and not as many anatomists have thought, on the front of the phalanx. It is these prolongations which, more extended than the aponeurosis, ought to be divided. When the skin and the aponeurosis are dissected, some difficulty is experienced in separating them, on account of the cellular tissue, and the fibrous prolongations which arise from the aponeurosis. These adhesions explain the puckering, and the movements of the skin. One might fear, in the section of the fibrous prolongations, the wounding of the vessels and nerves, but when the aponeurosis is stretched, it forms a kind of bridge which protects them, so that it can be cut without danger."

Two other successful cases are also reported in the same lecture, one occurring in a coachman, about 40 years of age, in whom both hands were similarly affected, so that this could not be attributed to the use of the whip. In the other case, the contraction occurred in the left hand of a wine-merchant.

Goyrand's Operation.—M. G. Goyrand, of Aix, operated upon these cases like Dupuytren, by open wound, but instead of making transverse incisions through the skin, and contracted fascial bands, as recommended by Dupuytren, he made longitudinal incisions over the fascial bands, or as he calls them, abnormal fibrous fasciculi, which he then divided transversely.

In the "Gazette Médicale,"* M. Goyrand observes :—"When this affection exists how can we cure it? No machines for extension will have any effect. Section of the bridles will alone allow extension of the fingers. . . . Dupuytren advised and performed the transverse section of the assumed small prolongations of the aponeurosis, and also of the skin that covered them.

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* "Gazette Médicale de Paris," 1835. Tome III., p. 485.

"In the Memoir* which I addressed to the Academy, I advised the longitudinal incision of the skin over each bridle, previously stretched, then to separate the lips of these incisions and detach from them the fibrous cords, and cut across these cords thus isolated. If the pre-digital bridles send out prolongations to the first phalanges, before inserting themselves into the second, one should cut them above and below these prolongations. If the section of these fibrous cords leaves shreds in the wound, they should be excised. The fingers should be afterwards fixed in a position of complete extension, and the incisions reunited by the first intention."

Mr. J. F. South, in his translation of Chelius,† alludes to Goyrand's operation, and observes:—"Goyrand does not divide the skin transversely, as Dupuytren does, because in straightening the finger the cut in the skin gapes too much; but he cuts through it longitudinally, and through the bridge transversely."

Cæsar Hawkins' Operation.—Cæsar Hawkins, in the year 1835, published in the "Medical Gazette"‡ an account of a case of Dupuytren's contraction affecting the little and ring-fingers of the left hand, in a man æt. 30, admitted into St. George's Hospital.

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* "Mémoires de l'Académie Royale de Médecine," Tome III.; and "Gazette Médicale," 1834, p. 219.

† "A System of Surgery," by J. M. Chelius. Translated by John F. South. Vol. II., p. 194. London: Renshaw. 1847.

‡ *Medical Gazette*, Vol. XV., p. 814, March 7th, 1835; and also in "Contributions to Pathology and Surgery," by Cæsar H. Hawkins, F.R.S. Vol. II., p. 205. London, 1874.

Mr. Hawkins was satisfied that the fascia alone was the seat of the contraction, and fully recognized the accuracy and importance of Dupuytren's observations which had been published in 1832, and to which he refers. In this case Mr. Hawkins successfully adopted Dupuytren's operation by open-wound, making one transverse incision in the palm for the division of the large fascial bands, and semi-circular incisions at the base of the little and ring fingers for the division of the digital prolongations of the fascia. The case did well, and the report states, "he has as much power over the fingers which were operated upon as any other."

In the year 1844, Mr. Cæsar Hawkins also published, in the "Medical Gazette," an account of another case of Dupuytren's contraction in both hands. "William Kisby, æt. 39, a coachman, was admitted on the 17th of April, with contraction, in a greater or less degree, of all the fingers of both hands, but chiefly of the fore, ring, and little fingers of the left hand, and of the ring, and little fingers of the right hand."

After alluding to Dupuytren's dissection, and his account of the pathology of this form of contraction, Mr. Hawkins observes:*—"Dupuytren says that it takes place in those persons who are subjected to laborious employments in which some hard substance is constantly rubbed and pressed in the palms of their hands, and he instances coachmen, of whom our patient is one, as being one of the classes liable to it. I think, however, you will be able to find a *few* coachmen in London besides this man, and perhaps you will look in vain for another instance of this contraction among them. I have seen it, moreover, in several instances, in persons of a higher class of life, who have never, so far as I know, been subjected to the causes I have mentioned; so that I am not certain that the opinion of Dupuytren is correct; and I do not see very clearly why, if it were correct, the contraction should be confined, as it almost invariably is, to the ring and little fingers, nor why it should attack both hands, as in this case (which is not, indeed, a common circumstance;) for the two hands are very differently employed in his labours. This man had some little contraction of the fore finger also, but it has nearly gone since he has been in the hospital, and it is unusual."

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* *Op. cit., Medical Gazette,* Vol. XXXIV., p. 273, May 31st, 1844; also "Contributions to Pathology and Surgery," by Cæsar H. Hawkins, F.R.S. Vol. II., p. 202. London, 1874.

It is especially worthy of remark in this case, that Mr. Hawkins was obliged to defer the operation in consequence of an attack of gout. Mr. Hawkins observes:—"I have not been able to perform the operation for our patient yet, for he was unfortunately attacked, a few days after admission with gouty inflammation, to which he is liable, in several joints successively, which has not yielded readily to medicine." This, probably, offers some better clue to the cause of the contraction than that afforded by his occupation.

Before proceeding to operate in this case, Mr. Hawkins carefully weighed, in his own mind, the supposed advantages of a subcutaneous operation for division of the fascia, which had suggested itself to him, and observes:*—"With regard to the mode of performing the operation, you are aware that for contraction of tendons, we generally endeavour, at the present time, to perform a subcutaneous incision, so that no air may enter the divided parts to interfere with union by the first intention; and the parts having united to a certain degree, extension is then made, to separate the ends while the united substance is still soft. Now I have turned over in my mind the propriety of acting thus in the present case, but I am inclined to think I shall not do so. You know that the great risk of wounds and injuries about the plantar and palmar fascia, is from confinement of matter, which is then made to pass along the tendons of the muscles, and thus they form very troublesome cases. Now in order to remove the contraction in this case, it will be necessary to make several cuts; the band of fascia must be divided in the palm before its separation to the two fingers, each finger must probably have another incision opposite to the joint, with the metacarpal bone, and very likely similar cuts must be made at the sides of each finger. To do this below the skin, which is inseparably joined to the fascia, must be at least very difficult, and not without risk of the digital arteries and nerves being injured; and then, as the extension on a hand-splint must be considerable, I think it would be altogether impossible to escape suppuration in some of the several incisions. If the operation is done in this manner, and matter does form, it is necessarily confined, and may do much harm. I think, then, I shall operate, as I have done before, by direct incisions through the skin and subjacent contracted portions of fascia. It is true, there will then be several suppurating wounds, a little lint being put between the edges of the incisions to prevent their union; but then, on the other hand, there will be no confinement of matter, and consequently no probability that the suppuration will extend itself beyond the small cuts themselves, which extension is much more dangerous than the open-wounds can be. It does not appear that Dupuytren met with any mischief when he did the operation in this way, and when I have done it myself, there was no inflammation of any importance produced."

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* *Op. cit.*, p. 203.

It will thus be seen that this accomplished English surgeon thirty-five years ago foreshadowed the subcutaneous operation recommended at present for its relief, and accurately indicated the spot at which the fascial band, or bands, in the palm of the hand, and also the digital prolongations of the palmar fascia should be divided. The danger of deep suppuration, however, outweighed, in Mr. Hawkins' opinion, the supposed advantages of the subcutaneous operation. He followed Dupuytren, and preferred performing the operation by open-wound.

In explanation of this decision, it must be remembered that subcutaneous surgery was at this time in its infancy, and the law upon which the safety of subcutaneous operations depend was not fully recognized. Subcutaneous tenotomy, as improved and performed by Stromeyer in 1831, was introduced into England in the year 1837, by Dr. Little, who had been operated upon by Stromeyer, in the previous year.

Busch's Operation.—Dr. Otto W. Madelung* has recently published an account of the treatment of cases of Dupuytren's finger contraction adopted in the Surgical Hospital at Bonn, by Professor Busch. This operation belongs to the class of open-wounds, and consists in dissecting up a triangular flap of skin from the contracted cord in the palm of the hand, and then dividing all the bands of the contracted fascia which can be reached; as the flap thus raised contracts, the lower points of the wound may be united by sutures:—"A light bandage closes the wound, the hand is then kept by the patient in a sling without the slightest attempt to preserve the extension.† . . . Extension movements with the finger are only made when the wound has entirely granulated, and then only in a light, gentle way. At first, wood cylinders of various sizes are laid in the hand; later the hand is stretched on a back splint. Active and passive movements are now to be made in, and during the time the hand-bath is used for cleansing of the wound. More complicated apparatus than the above are never required. The healing of the wound, accelerated, perhaps, by skin-grafting, is accomplished in three or four weeks." Successful cases under this treatment are referred to, but one is added by the author, in which, notwithstanding the use of Lister's antiseptic treatment, suppuration with sloughing of the flexor tendon of the little finger took place, this however is stated to have been the only unfavourable case.

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* "The Causes and Operative Treatment on Dupuytren's Finger Contraction," by Dr. Otto W. Madelung. No. 15 of the "Berliner Klinische Wochenschrift," for 1875. Translated from the German. London: Trübner & Co., 1876; and a review of Dr. Madelung's pamphlet will be found in the *Dublin Journal of Medical Science* for December, 1876, p. 486.

† *Op. cit.*, p. 11.

Madelung, in referring to the number of cases from different countries which had fallen under his observation, and had resorted to Bonn for the sake of the opinion of Professor Busch, whose treatment he especially records, states "that almost all these individuals had sought surgical help, and carried out various methods of treatment, both mechanical and operative, all of which had failed;" and he further observes:—"The surgeons of all countries seem to be unanimous in their opinion of the inutility and danger of the operative treatment of the disease in question."

Post's Operation.—Professor Alfred C. Post,* of New York, also operates upon these cases by open-wound, making incisions at a number of points, but not larger than absolutely required, as he believes that the adhesion to the skin prevents a strictly subcutaneous section being made. He advocates immediate extension on a metal splint, the dressings to be removed every two or three days, and passive motion applied. Of the five cases cited by Professor Post, only one, No. 3, that of a lawyer, æt. 44, who suffered from contraction of the fingers in both hands, seems to have been of Dupuytren's contraction, the others depending on abscesses and traumatic inflammation.

During my visit to America in 1876, when I went as the representative of the Medical Society of

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* "On Contraction of Palmar Fascia, and of the Sheaths of the Flexor Tendons," by Alfred C. Post, M.D., of New York. *Archives of Clinical Surgery,* August, 1876.

London, to attend the International Medical Congress in Philadelphia, I had the opportunity of discussing this subject with Professor Post. He seemed to be strongly of opinion that it was impossible to divide the contracted cord in the palm of the hand by subcutaneous incisions, as adhesion to the skin prevented the knife being passed between the skin and the cord. I explained, however, that the close adhesion between the skin and the cord—even in very severe cases—never extends through the entire length of the cord, and that by flexing the hand at the time of operation, it was possible to introduce the small fascia knife under the skin, and pass it between the skin and the cord, generally at the two extremities of the latter, where the skin was not adherent to the cord. This allows of an immediate gain by extension; and that portion of the cord at which close adhesions of the skin exist being thus isolated and freed from tension, undergoes a gradual process of atrophy and absorption, just as all the knotty cutaneous thickenings do, after the subcutaneous division of the fascial bands.

Sir William Fergusson's Operation.—The late Sir W. Fergusson alludes to the operation by open-wound as likely to obviate the disposition to re-contraction, and observes:*—" Indeed, so much is this the case, that if the offending part were very superficial, I should be inclined to dissect a portion of it out at once.

" In many cases, I believe, this last named practice should be resorted to at first. An incision should be made lengthwise through the skin over the whole of the contraction, and if the integument be tolerably soft and thick, it should be turned off on each side, so as to expose the fibrous tissue, which should then be carefully taken away. To effect this satisfactorily, it is sometimes advisable to make one or more cross incisions in the skin, for this tissue, having been long contracted, does not stretch so readily as in a healthy state. In any, or all of these operations, the utmost care should be taken to avoid the nerves and blood-vessels at each side of the finger, and if the stretching can be satisfactorily effected without opening a sheath or touching a tendon, so much the better, as then some movement might be expected afterwards; but if the tendons require division, the finger must remain stiff, and, in anticipation of such an event, it will be well to consider what good can be expected from the proposed operation."

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* *Op. cit.*, p. 260.

My colleague, Mr. John Gay, tells me that he has successfully adopted the plan above recommended by Sir William Fergusson, of dissecting out the contracted fascial band. In one case, about a year ago, I had the opportunity of seeing him perform this operation in a gentleman whose little finger of the left hand was much contracted. An incision was made through the length of the contraction, and the fascial band was carefully dissected out. Suppurative inflammation followed the operation, and the articulation was involved. Ultimately, however, the case did well, but the joint remained permanently stiff.

Operations by open-wound condemned.—All operations, by open-wound, for these cases should be condemned as unnecessarily severe—involving a long, and tedious reparative process, with the risk of suppurative inflammation, and also a liability to failure, in which event the condition of the patient would be worse than before the operation, contraction from cicatrix being one of the most difficult conditions to relieve.

In illustration of this I would refer to the case represented in Fig. 17. Dr. C. a physician practising obstetric medicine, and formerly a colleague of my own. The little finger of the right hand had, for some years, been increasing in contraction, and he submitted to an operation by open-wound, the contracted fascia being, I believe, dissected out, rather than simply divided. The operation failed, and the contraction returned in an aggravated form, as shown in the wood-cut.

I operated upon the finger by subcutaneous division, and gradual mechanical extension in the year 1863. Considerable improvement followed, but in consequence of the cicatricial contraction resulting from the previous operation, it was impossible to bring the finger into a perfectly straight position.

Nevertheless, in England the operation by open-wound has long been practised by the majority of surgeons, and is still recommended in some of the text-books, when the subcutaneous operation has failed, as it is generally supposed to do.

General distrust in Operations.—There is, in England, a general distrust in all operative procedures for the treatment of this affection, which is regarded as incurable; and in consequence of the supposed necessity for the division of tendons, the patients are generally advised to bear the ills they have, rather than run any risk from suppurative inflammation, with the doubtful gain of a stiff and useless finger.

SUBCUTANEOUS OPERATIONS.

Subcutaneous operations for contracted fingers have been performed by many surgeons in this and other countries, and it is interesting to trace the history of these operations, and note the changes of opinion that have taken place with respect to the relative merits of the plan of operating by open-wound, or the subcutaneous method; the more recent changes being in favour of a return to the method of operating by open-wound.

The earliest mention of a subcutaneous operation, or an approach to a true subcutaneous operation, as understood at the present time, for finger contraction, will be found in the works of Sir Astley Cooper, written long before the observations of Dupuytren describing the pathology of this affection, and before the introduction of subcutaneous tenotomy by Stromeyer.

Sir Astley Cooper's Subcutaneous Operation.—Sir A. Cooper in his "Treatise on Dislocations and Fractures,"* makes the following brief but important allusion to the affection we are now describing as Dupuytren's contraction of the fingers. In the chapter on "Dislocations of the Fingers and Toes," after describing a partial dislocation or displacement of the toes produced by contraction of the flexor tendons, causing the contraction we now describe as "the hammer toe," for which he recommends amputation as the only means of relief, Sir A. Cooper proceeds to observe at page 524: "The fingers are sometimes contracted in a similar manner by a chronic inflammation of the thecæ, and aponeurosis of the palm of the hand, from excessive action of the hand, in the use of the hammer, the oar, ploughing, &c. When the thecæ are contracted, nothing should be attempted for the patient's relief, as no operation or other means will succeed; but when the aponeurosis is the cause of the contraction, and the contracted band is narrow, it may with advantage be divided by a pointed bistoury, introduced through a very small wound in the integument. The finger is then extended, and a splint is applied to preserve it in the straight position."

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* "A Treatise on Dislocations and Fractures of the Joints," by Sir Astley Cooper, Bart., F.R.S. First Edition, p. 524. London, 1822. Precisely the same paragraph also occurs in the Fifth Edition, p. 487. London, 1826; and it is again repeated without alteration in the edition enlarged and edited by B. B. Cooper in the year 1842.

It is very remarkable to find that this great English surgeon not only recognized the importance of contraction of the palmar fascia—apart from contraction of the tendons, or chronic inflammation of the thecæ—as a cause of finger contraction in some cases; but that he also recommended a subcutaneous operation for the division of the contracted band of fascia, and adopted the plan of immediate extension of the finger after the operation.

Although Sir A. Cooper's operation, according to the description given, was not performed strictly in accordance with the principles of subcutaneous surgery, as now understood, nor with all the precautions to exclude the admission of air, adopted at the present time, still it seems to be the nearest approach to a true subcutaneous operation, and there can be no doubt that in a great degree Sir A. Cooper foreshadowed the operation and after-treatment, which it is my object to advocate in the present paper.

Jules Guérin's Subcutaneous Operation.—There may be at the present time some difficulty in ascertaining to whom the credit belongs of having first performed the subcutaneous operation for finger contraction; but my friend, Dr. Henry Dick, whose intimate acquaintance with the foreign literature of subcutaneous surgery renders him an authority upon the subject, states that the first account of the subcutaneous operation for contracted fingers is to be found in the writings of M. Jules Guérin, who probably was the first to perform this operation. To M. Jules Guérin we are chiefly indebted for the advancement of subcutaneous surgery, after Stromeyer had reintroduced and improved subcutaneous tenotomy in the year 1831—an operation which had been allowed to remain dormant since it was first performed by Delpech in the year 1816, and the rules for the after-treatment, almost identical with those adopted at the present time, had been laid down by him.

Subcutaneous tenotomy was undoubtedly the starting point from which subcutaneous surgery has gradually been developed, including as it does at the present time a vast number of operations which owe their immunity from inflammation, and absolute freedom from danger, to the fact of their being performed in such a manner as effectually to exclude the admission of air.

Although the law upon which subcutaneous surgery is based had been first pointed out by Hunter* in

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* "Treatise on the Blood, Inflammation, and Gun-shot Wounds," by John Hunter. London, 1794.

1794, when he described the difference in the healing of wounds, and made the exposure or non-exposure of air the basis of his classification of injuries, still for the practical application of this law, and the extension of subcutaneous surgery we are mainly indebted to M. Jules Guérin, who must be regarded as the chief exponent of the subcutaneous law* in its physiological and pathological bearings. He more especially directed attention to the difference between the reparative process in subcutaneous and in open-wounds; and in the absence of inflammatory products in the subcutaneous class, discerned the greater perfection of the reparative process leading to the immediate union of divided structures by the organization of effused blastematous material. These observations have since been confirmed by Sir James Paget,† who added, from microscopical observations, a description of the structural changes which occur in the development of the reparative material in the two great classes of wounds, viz.: the open-wounds exposed to the influence of the air, and the subcutaneous wounds from which the air is excluded.

In the discussions which took place in the Académie de Médecine‡ in Paris, in the years 1842 and 1843, and in which M. Jules Guérin, Bouvier, Malgaigne,§

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* "Essais sur la Méthode sous-cutanée," par M. Jules Guérin, Paris, 1841.

† "Lectures on Surgical Pathology," Vol. I., p. 170. London, 1853.

‡ "Bulletin de l'Académie Royale de Médecine." Tome VIII. 1842-1843. "Discussion sur la Ténotomie des Fléchisseurs de la Main et des Doigts," pp. 129, 154, 230, 253, 341 to 559.

§ See also observations by Malgaigne on the various forms of finger contraction, "Déviation des Doigts;" Première Leçon et Deuxième Leçon in his "Leçons d'Orthopédie," by J. F. Malgaigne. Paris, 1862.

Velpeau, and others took part, it does not appear that the opinion of Dupuytren, that the palmar fascia alone was the cause of the finger contraction, was generally admitted. M. Jules Guérin speaks of the necessity of dividing the flexor tendons, and states that he not only obtained perfect union of the divided extremities without adhesions, but that the movement in the fingers was well preserved. Although the precise date must be uncertain, there can be no doubt that M. Guérin operated subcutaneously for the relief of Dupuytren's finger-contraction.

Sir William Fergusson's Subcutaneous Operation.—The late Sir W. Fergusson recommended the subcutaneous operation in some cases, and in the last edition of his "Practical Surgery,"* refers to it in the following terms:—"Such cases may be treated with subcutaneous division of the rigid textures, and when extension alone will not suffice, it is a method which, in many instances, I consider preferable to any other. A narrow knife should be pushed under the skin in front of the contraction, and then carried through the most prominent band, whether this be merely the aponeurosis, condensed cellular tissue, or tendons, and thereafter the fingers should be gradually extended in a splint by means of bandages."

Dr. Little's Opinion.—In the "System of Surgery,"† edited by T. Holmes, the writer of the article on "Orthopædic Surgery," Dr. Little, describes Dupuytren's contraction of the fingers, and considers that the flexor tendons are implicated in the contraction, and require division. He recommends a subcutaneous operation, and observes:—"In rigid unyielding cases of long duration, tenotomy is remarkably efficacious . . . . A puncture half a line in width suffices for the passage of a firm tenotome beneath the tendon in the palm. The tendon is thus divided from below upwards . . . . considerable yielding of the contracted finger, the tendon of which has been severed, is at once perceived. Manipulations and mechanical treatment complete the cure. We have frequently thus effected entire restoration of the hand and fingers . . . . This operation is a valuable illustration of the success of subcutaneous tenotomy compared with Dupuytren's painful operation, even when performed by so able a surgeon as the late Sir A. Cooper. We have had under observation two cases in which, by means of a large crucial incision in the palm, the indurated fascia had been dissected out and removed. The operation had no better result than that of causing a large contracted cicatrix, more rigid than the former state of things, and quite irremediable."

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* *Op. cit.*, p. 259.

† "A System of Surgery." Edited by T. Holmes. Second Edition. Vol. III., p. 698. London: Longman & Co., 1870.

Erichsen's Opinion.—In the last edition of Professor Erichsen's work on "The Science and Art of Surgery," the essential dependence of the form of finger-contraction, we are now describing, upon thickening and contraction of the palmar fascia and its digital prolongations is fully recognized, and this is attributed partly to local, and partly to constitutional causes such as a rheumatic, or gouty diathesis. The subcutaneous division of these structures is recommended, and when this fails, the author advises that the operation by open-wound should be had recourse to. Professor Erichsen observes:[*] "*The treatment* of digital contractions is purely operative. The kind of operation must be determined by the pathological cause of the disease. If the contraction be tendinous, then subcutaneous tenotomy must be done. If, as far more commonly is the case, it be fascial, then the tendon and its sheath must not be touched, but the contracted structures outside them must be cut across. This consists, when the deformity is slight and recent, in dividing each tense digital fascial prolongation by a subcutaneous incision. This should be done opposite the second phalanx where it is usually most tense; but if the other finger-joints be affected, a separate section may be required opposite each phalanx. Should it be found impossible to straighten the fingers with such limited incisions, or should the skin be firmly adherent to the subjacent fibrous band, a long crucial incision may be made through the skin, the flaps dissected back, the fascial bands divided, or dissected off the sheaths of the tendons, and the fingers straightened. As the flexor tendons are not primarily affected, they need not be divided. After the operation, the hand should be placed on a digitated splint, and the fingers kept extended."

Gant's Opinion.—In the second edition of Mr. Gant's "Science and Practice of Surgery,"[†] recently issued, the influence of the palmar fascia in the production of the contraction is also recognized, and its subcutaneous division recommended. But tenotomy is also recommended in some instances, and a case in which the author successfully divided the tendons, in a clergyman, aged 79, in whom both hands were similarly affected, is adduced in illustration. The operation, by open-wound, in which the skin is dissected back, and the fascial bands either divided, or dissected out, is also described.

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[*] "The Science and Art of Surgery," by John Eric Erichsen. Seventh Edition, Vol. II., p. 363. London: Longman & Co., 1877.

[†] "The Science and Practice of Surgery," by F. J. Gant. Second Edition, Vol. I., p. 833. London: Baillière, Tindall & Cox, 1878.

Bryant's Opinion.—In the third edition of Mr. Bryant's "Practice of Surgery,"* just published, although the author considers that the flexor tendons, as well as the palmar fascia, produce the contraction, the subcutaneous operation with the modifications in its performance, and the after-treatment which I have adopted is recommended, and the directions for its performance, which I published in the *British Medical Journal* of June 29th, 1878, are given at length. Mr. Bryant also refers to the operation by open-wound of Professor Busch, of Bonn, described by Madelung, to which I have already adverted, and observes, "I have adopted this practice in several cases with excellent results."

Druitt's Opinion.—In the last edition of Druitt's "Surgeon's Vade Mecum,"† Dupuytren's finger-contraction is described as depending essentially upon "shortening and rigidity of the palmar aponeurosis," and this is illustrated by a woodcut taken from Mr. Partridge's dissection in King's College Museum (the same as represented in Figs. 1 and 2). The idea of its dependence upon contraction of the flexor tendons, or adhesions to the sheath of the tendons is strongly opposed by the author who, in reference to its cause, observes: "This affection is not caused by any particular occupation, but is part of the morbid changes accompanying *chronic rheumatic arthritis, or rheumatic gout*, and is a malady of the comfortable classes." As to the treatment, Dr. Druitt relies entirely upon the subcutaneous division of the contracted bands of the palmar fascia, and its digital prolongations, followed by immediate extension, as recommended by myself, and the directions for its performance, together with the after-treatment which I have given, are quoted at length.

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* "A Manual for the Practice of Surgery," by Thomas Bryant. Third Edition, Vol. II., p. 323. London : Churchill, 1879.

† "The Surgeon's Vade Mecum," by Robert Druitt. Eleventh Edition, p. 696. London : Henry Renshaw, and J. & A. Churchill, 1878.

The subcutaneous operation, with the modifications which I have adopted, being thus brought prominently before the profession in Mr. Bryant's and Dr. Druitt's Manuals of Surgery, will doubtless soon be subjected to the test of professional experience, and the result will I confidently anticipate, be equally as favourable as that which has hitherto attended the operation in my own experience.

OPERATION AND AFTER-TREATMENT ADOPTED BY THE AUTHOR.

I have never practised any other than the subcutaneous operation for contracted fingers; but within the last few years have materially modified the details, both with regard to the mode of performing the operation and the after-treatment. The success has been found greater, and the treatment much less irksome to the patient, as well as of shorter duration than the method of operating, and the after-treatment which I adopted in the earlier part of my practice, from the teaching of my late colleagues and predecessors at the Orthopædic Hospital, Mr. Tamplin and Mr. Lonsdale. They believed that both fascia and tendon were involved in the contraction, and divided the contracted cords in the palm of the hand in the same way as they divided tendons, subcutaneously cutting from below upwards, and making only one puncture.* They also adopted the same method of after-treatment, by gradual mechanical extension, using steel instruments, with rack-and-pinion movements opposite the joints of the fingers, like that represented in Fig. 10.

Further study of these cases, and the opportunity which was accidentally afforded me of seeing that the tendons were not involved in a severe case of finger-contraction previously referred to, in which the palm of the hand was torn across by a horse, confirmed me in the belief that the tendons were not implicated in this form of contraction of the fingers, and that surgically, we had to deal with contraction of the palmar fascia alone, as Dupuytren had described the affection.

I therefore commenced the practice of making *multiple subcutaneous divisions of the fascia and its digital prolongations*, introducing the smallest tenotomy knife—smaller than any ordinarily in use—or fascia-knife, I prefer to call it, with a straight cutting edge terminating in a point, as shown in Fig. 5, and carrying it between the skin and the contracted cord, which I then divide by cutting downwards very slowly and cautiously, taking care not to dip the

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* "On the Nature and Treatment of Deformities," by R. W. Tamplin, p. 262. London: Longman & Co., 1846.

FIG. 5.

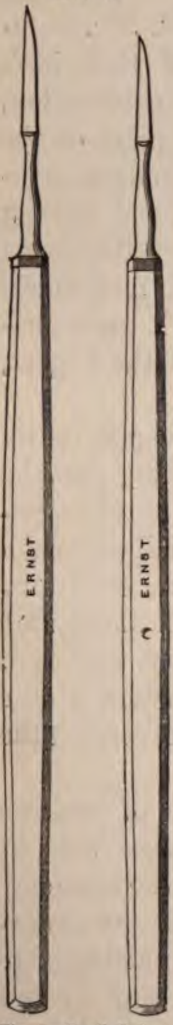

Fig. 5.—Small Knives with straight cutting edge, used for division of bands of fascia.

point or divide any structures, except the contracted band of fascia. The central pointed tenotome generally used does not divide the fascial bands so readily or with the same precision, and the smaller bands, or digital prolongations, are apt to slip off the point of the ordinary tenotome. In one case, where three fingers were contracted, I made as many as nine punctures and subcutaneous divisions; but when so much is required to be done, I think it advisable to confine the operation to one, or two fingers, making not more than five or six punctures, in many cases four will be found sufficient, and leave the other finger or fingers to be treated at a subsequent operation.

As a rule I make the *first puncture* at the greatest distance from the finger, in the palm of the hand, between the transverse crease and the annular ligament, a little removed from the point where the skin is adherent to the fascia, and at a spot where the skin is not tightly stretched over the contracted cord, so that the fascia knife can be readily introduced between the two.

The *second puncture* should divide the same cord as the first, but as near to the finger as possible—between the transverse crease and the web of the fingers, thus leaving the contracted band in the palm of the hand, where adherent to the skin, isolated, and cut off from its connexions at its upper and lower extremities.

The *third and fourth* punctures divide the lateral bands, or the digital prolongations of the palmar fascia, which pass from the central cord in the palm to the adjacent sides of the fingers. These must be divided very carefully, in order to avoid cutting the vessels and nerves along the sides of the fingers. The punctures should be made at the bifurcation of the cutaneous web between the fingers, and the incisions directed obliquely upwards and outwards, towards the palm of the hand. These incisions will divide the strongest and most prominent bands which produce the flexion of the first phalanx of the finger upon the hand, and if care be taken to avoid dipping the point of the knife, there will be no fear of wounding vessels or nerves.

Sometimes lateral bands of contracted fascia require to be divided opposite the centre of the first phalanx, and this must be done by puncture at the edge of the contracted bands, the knife being directed transversely towards the bone; but this cut must be made very carefully to avoid the artery and nerve, the surgeon remembering that the band, though tough and strong, is at the same time very thin.

Occasionally, a lateral band may have to be divided between the first and second phalanx, or one on either side, at a point corresponding to the articulation, and this must be done carefully, and with the precautions just described.

I always avoid making any central incisions in front of either the first or second phalanx, as the sheath of the tendons, or the tendons themselves, may be readily divided by such incisions, and would lead to a loss of power of flexing the finger after the operation.

As the fascia-knife is being withdrawn from each puncture, the surgeon should make pressure with the forefinger of his left hand on the spot at which the fascia has been divided, and the subcutaneous track through which the knife has passed. A pledget of lint should be immediately applied over each puncture and retained in position by a strip of plaster. By these means hæmorrhage under the skin is arrested, and the true subcutaneous character of the operation preserved. After the requisite number of punctures have been made and thus protected, an additional compress of lint should be applied, and the hand bandaged with the fingers in an extended position—quite straight, if they can be brought so—to a softly padded metal splint as shown in Fig. 6.

At the same time I also adopted another important modification in the treatment of these cases, viz. :—The plan of *immediate extension*, bringing the finger, or fingers, as nearly as possible into the fully extended position, at the time of the operation; and afterwards applying, as a retentive apparatus, a well padded metal splint, bent to the shape of the wrist, hand, and fingers, and applied along the palmar surface. The finger, or fingers, as well as the hand and wrist, are then bandaged to the splint, as shown in Fig. 6. This was a great change from the prolonged after-treatment required by the method of gradual mechanical extension made with the complicated steel instrument regulated by rack-and-pinion movements.

I was led to make this alteration from the gradual to the immediate mechanical extension after considering the pathological conditions and the objects to be accomplished with regard to the reparative process in fascia, as distinguished from the reparative process in tendon. *The object of immediate extension* is to widen as quickly as possible the gaps made by the incisions in the fascia, with the view of preventing union of the divided fascia, or to have the union as feeble as possible; objects precisely the reverse of those we desire to obtain after the subcutaneous division of tendons.

FIG. 6.

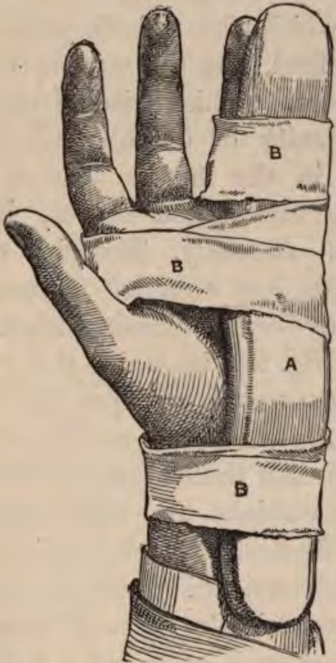

Fig. 6.—*A*. Retentive metal splint, softly padded, to which fingers and hand are bandaged *B*, immediately after operation.

Cases in which immediate extension cannot be carried out.—In some cases, it will be found impossible to carry out this method of immediate extension to the full extent required, more especially in those cases in which the second phalanx is sharply flexed upon the first, and the contraction has existed for several years. This arises from two causes: *First,* The difficulty of dividing all the contracted fascial bands, in the neighbourhood of the joint, without risk to vessels and nerves, the tendons, or even the joint. *Secondly.* The risk of tearing the skin if immediate and complete extension should be attempted by any forcible manipulation. In the case represented in Fig. 23, in which the second phalanx of the little finger was flexed upon the first at a right angle, immediate extension could not be made to much more than half the extent required to bring the phalanges in a straight line with each other. The contraction of the first phalanx was immediately, and almost completely relieved by the division of the contracted fascial cord in the palm of the hand, and this, indeed, is the general rule; but the digital contraction remaining rendered it necessary to resort to the method of gradual mechanical extension, which I commenced on the fourth day with the instrument represented in Fig. 10. It took four weeks before the phalangeal contraction could be completely overcome, and all the phalanges brought into a perfectly straight line with the metacarpal bone, as shown in Fig. 24, and even during this rate of extension, the skin on the palmar aspect of the finger became so thin, shiny, and attenuated, that the extension had to be intermitted to some extent.

In some very severe cases, also, of palmar fascia contraction in which the three outer fingers are involved, and have been drawn down into the palm of the hand for many years, immediate extension cannot always be made to the full extent required; generally, in these cases, about two-thirds of the full amount of extension may be immediately obtained by division of the contracted fascial bands in the palm of the hand.

In both these classes of cases, therefore, it will be found necessary to resort to the method of gradual mechanical extension, but this may be carried out as rapidly as it can be borne by the patient.

AFTER-TREATMENT.

The first dressing of lint and plaster should be allowed to remain undisturbed until the fourth day, by which time the cutaneous punctures will be found to have healed. The padded metal splint must also be worn continuously day and night for four days, but may be removed and re-adjusted at any time, either to relieve the pain sometimes caused by extension, or to diminish the pressure made by the extra lint-compress applied after the operation under the metal splint, to prevent hæmorrhage extending under the skin; and for the removal of this compress I generally take off the metal splint the day after the operation, and re-apply it with a lighter bandage.

The after-treatment beyond the fourth day will vary much according to the possibility, or otherwise, of carrying out the immediate extension principle. *When this method succeeds*, as I have found it to do in nearly every case in which the first phalanx is flexed towards the palm of the hand, by contraction of one of the four primary divisions of the palmar fascia and its digital prolongations, some form of retentive metal splint is all that will be required, and I generally use that represented in Fig. 7, applied on the palmar aspect of the hand and fingers. This should be applied on the fourth day after the operation, the lint and plaster being removed. In some cases a retentive metal splint, applied on the dorsal aspect of

FIG. 7.

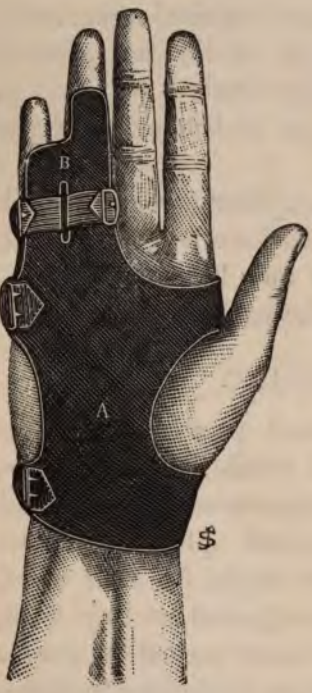

FIG. 8.

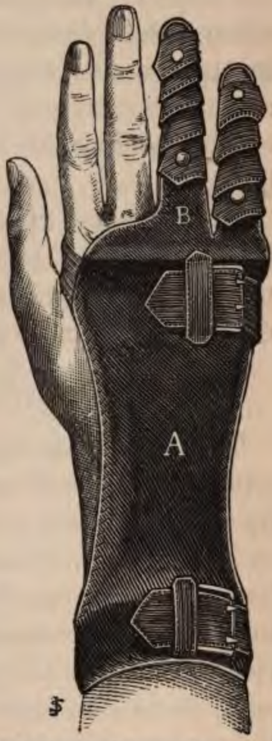

Fig. 7.—*A*. Retentive metal splint, applied on palmar surface of hand and fingers, *B*, which are fastened to it by straps. To be applied fourth day after operation.

Fig. 8.—*A*. Retentive metal splint, applied along back of hand and fingers, *B*, which are fastened to it by straps; sometimes preferred to splint applied on palmar aspect of hand, Fig. 7. To be applied fourth day after operation.

the hand and fingers, is preferred by the patient, and the form of splint represented in Fig. 8, will be found to answer very well.

Another form of retentive metal splint is that represented in Fig. 9, consisting of a flat metal band passing along the dorsal aspect of the hand and finger fastened round the wrist, and having a small leather cap at the end, made to receive the tip of the finger. For the pattern of this splint, I am indebted to my friend Dr. Guiness Beatty of Dublin, whose uncle—Dr. Beatty, the celebrated Obstetric physician—suffered from finger contraction, and wore this form of

FIG. 9.

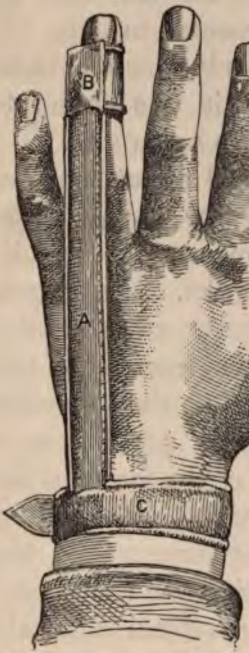

Fig. 9.—*A.* Another simple form of retentive metal splint, applied on dorsal aspect of hand and finger, the tip of which is received into leather ring *B.*, fastened round the wrist *C.* Useful in some cases, and easily applied at night.

splint at night; and by this means, together with the habit of extending the finger during the day, prevented the increase of the contraction to any formidable extent, notwithstanding the hereditary character of the contraction in his family. This form of splint may be made of whalebone instead of steel, which was done by a medical man, my friend Mr. R., whose case is represented in Fig. 13. He continued to wear it at night only, for a considerable time after the operation, and it was found to be thoroughly efficient as a retentive apparatus.

The retentive metal splint may be taken off every night and morning for the purpose of washing, but with these interruptions it should be worn continuously for three weeks. The finger, or fingers, will appear to be perfectly straight at the end of the first week, when the immediate extension principle is successful, but unless the extension be maintained during the reparative process so as to keep the divided extremities of the fascia as far apart as possible, they might re-unite, and the finger again become drawn down. After three weeks, the extension may be discontinued during the day time, and free motion encouraged, but the retentive metal splint should be worn at night for another month, or longer, if the straightening of the fingers be not quite perfect.

The nodulated thickenings of the skin disappear spontaneously, and often with great rapidity, but I usually recommend gentle friction with oil, or iodine ointment, which softens the skin.

When it is found impossible to carry out the immediate extension principle to the full extent required, which may occur in cases of great severity,—

more especially in those cases in which the contraction has commenced in the phalanges already described, and the second phalanx is sharply flexed upon the first,—it will be found necessary to resort to the method of gradual mechanical extension, in a modified form, *i. e.*, the extension must be made as rapidly as it can be borne by the patient, great care being taken, to avoid abrasions from excessive pressure, or the swelling of the finger or joint, from constriction by the bandage. The skin in the concavity of the contraction must also be carefully watched, as in some cases of long standing, it becomes rapidly thinned, shining, and attenuated under a too rapid extension.

The idea is still that of rapid extension, but it must be carried out with these precautions. The instrument best adapted for this purpose is that represented in Fig. 10; the extension can be carefully regulated by a rack-and-pinion movement placed opposite each articulation, so that either the surgeon, or the patient, can regulate the degree of tension at pleasure, and avoid any undue pressure. It should be applied on the fourth day, and worn continuously for several weeks, according to the severity of the case. As a general rule, it is advisable to keep up the continuous extension for a fortnight after the finger has been completely straightened; it may, however, always be removed night and morning for the purpose of washing, gentle friction with oil may then be employed, and a little movement allowed. The patient is delighted to find he has the full power of flexion and extension, proving conclusively that no tendon has been divided, but I do not encourage active muscular movements until after the third week from the operation; the reparative process at the seat of division requires this period of quiescence.

FIG. 10.

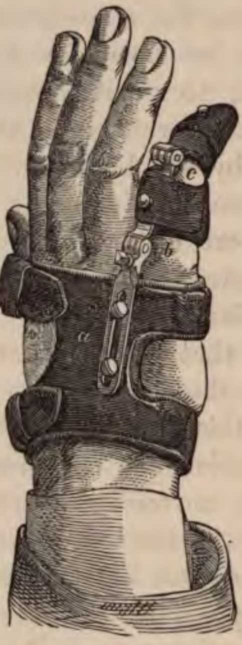

Fig. 10.—Contracted finger-instrument applied on dorsal aspect of hand *a* with two rack-and-pinion movements opposite knuckles *b* and *c*, for making gradual extension. To be applied fourth day after operation, when immediate extension principle cannot be carried out.

When the instrument with rack-and-pinion movements is discontinued, or the finger has become straightened by its use, it is advisable for the patient to continue to wear at night, for a month or two, the light and simple retentive metal splint represented in Fig. 7. Although the after-treatment may be a little prolonged when it is necessary to make the extension by the instrument with rack-and-pinion movements, the ultimate result is equally good.

Anæsthetics.—With regard to the employment of anæsthetics in these operations, which must necessarily be done slowly and very carefully—several punctures being made—I have always advised the use of chloroform or ether. I abandoned the use of ether spray, after employing it some years ago, because it was found to harden the skin, so as to make the puncture difficult, and obscure the anatomical relations of the parts. It occurred to me, however, that if I rapidly thawed the frozen skin by rubbing it with my hand, the deep anæsthesia would probably remain long enough for a subcutaneous operation, and this I have found to occur. In the case of a medical friend, Mr. R., upon whom I operated for contracted fingers, 17th of January, 1877, and who objected to take either chloroform or ether from the condition of his circulation, I made four punctures during the employment of the ether spray, and he only felt one of them, and that very slightly.

The hand of the gentleman alluded to, Mr. R., is represented in Fig. 13, showing severe contraction of the middle and ring fingers of the right hand, previous to operation, and its improved condition more than two years after the operation is shown in Fig. 14. The fingers are perfectly straight and useful, without any loss in the voluntary power. I need hardly say that, as a medical man, the contraction of the middle and ring-fingers had, in this case, been found seriously to interfere with his professional duties, and the complete restoration of the hand to usefulness affords good testimony to the value of the subcutaneous method of operating. The objection of hardening the skin, therefore, being done away with, the local anæsthesia, by the ether spray, is now found to be applicable to tenotomy, and some other subcutaneous operations, as its inventor, Dr. Richardson, originally thought it would be.

The operation and after-treatment which I now practice may be described as follows :—

1. The subcutaneous division of all the contracted bands of fascia which can be felt; the bands to be divided by several punctures with the smallest fascia knife, represented in Fig. 5, passed under the skin, and cutting from above downwards. A pledget of lint being at once placed over each puncture, and retained in position by a strip of plaster.

2. Immediate extension to the full extent required for the complete straightening of the fingers, where this is possible, and the application of a retentive well padded metal splint, from the wrist along the palm of the hand and the fingers; the fingers and hand to be bandaged to the splint. When the extension cannot be immediately made to the full extent, as in those cases in which the second phalanx is sharply flexed upon the first, it must be carried as far as possible, without producing pain or incurring the risk of tearing the skin.

3. The bandage not to be removed until the fourth day,—unless rendered necessary by the occurrence of pain,—when the lint and plaster may be taken off, as the cutaneous punctures are always found to be healed by that time. The retentive metal splint to be re-applied, and the hand and fingers bandaged to it. Should the immediate extension produce much pain, the splint may be removed and re-adjusted at any time.

4. Extension to be kept up by the splint worn continuously night and day for two or three weeks; but the splint and bandage to be changed every two or three days. After this, the extension splint is to be worn at night only, for an additional three or four weeks, free motion being encouraged during the day.

Relapse of the Contraction I believe is now, to a great extent, guarded against by the plan of dividing all the contracted bands of fascia by as many punctures as may be necessary, and also by the adoption of the method of immediate extension. If partial relapse should occur—and I have never known more than this in a few out of the large number of cases upon which I have operated—any bands that may have escaped division, or any which may since have become prominent by the extension, may be divided subcutaneously, and the disposition to re-contraction prevented at an early stage. This contrasts very favourably with the relapsed cases after open-wound, which from the nature of the cicatricial contraction are incapable of further relief.

In the present paper it has been my object to give an increased confidence in the subcutaneous operation for Dupuytren's contraction of the fingers; and to point out some details and modifications in the mode of performing the operation, as well as the alterations in the after-treatment which I have been led to adopt, and upon which I believe much of the success will be found to depend.

ON
THE OBLITERATION
OF
DEPRESSED CICATRICES
AFTER
GLANDULAR ABSCESSES, OR EXFOLIATION OF BONE,
BY A
SUBCUTANEOUS OPERATION.

ON

THE OBLITERATION

OF

DEPRESSED CICATRICES.*

AMONGST the operations which surgeons are not unfrequently called upon to perform, for the purpose of diminishing some of the effects of accident or disease—especially when producing any unsightly appearance—may be mentioned the operations for the removal or obliteration of deeply depressed cicatrices, such as result either from chronic glandular abscesses in the neck, as in *Case* 2, the cure of which is exhibited in Fig. 2; or in this region from abscess depending upon necrosis of bone from the lower jaw, sometimes caused by difficulty in cutting the wisdom teeth, as in *Case* 3, represented in Fig. 3, and its cure in Fig. 4.

In the face, deeply depressed cicatrices are sometimes seen as the result of abscess connected with decayed teeth, or difficulty in cutting the wisdom teeth in the upper jaw; many examples of this class have fallen under my observation. Also as the result of injury to bone, as in *Case* 1, in which a portion of the malar bone had been carried away by a pistol-shot. It was, indeed, this case which, in the year 1864, led me carefully to study the difficulties to be overcome in obliterating these deep depressions, and to suggest the method of operating which I have now so successfully employed.

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* This operation was first brought before the notice of the Profession in a paper which I read in the Surgical Section at the Annual Meeting of the British Medical Association in Edinburgh, August, 1875, entitled "A New Operation for the Obliteration of Depressed Cicatrices after Glandular Abscesses, or Exfoliation of Bone," and published in *The British Medical Journal*, April 29th, 1876.

Deeply depressed cicatrices are also met with in various parts of the body, as the result either of glandular abscesses, such as occur in the groin, or of abscesses connected with diseased bone, as in psoas and lumbar abscesses, which occasionally give rise to very deep depressions, but being removed from sight, rarely call for surgical interference.

If these depressed cicatrices should be produced in childhood they would increase during the period of growth, just as other cicatrices do—a fact which I pointed out, and illustrated by casts and drawings, in a paper published in the "Transactions of the Pathological Society" for the year 1860, Vol. XI. p. 292, and further described in a paper read at the Medical Society of London,* November 17th, 1873.

Deeply depressed cicatrices adherent to the subjacent bone, are frequently seen as the result of abscesses arising from strumous periostitis, with or without exfoliation of bone, such as occur in the leg, and in the arm, or fore-arm, and sometimes on the back of the hand after caries of one or more of the metacarpal bones. When occurring in exposed parts of the body, these unsightly depressions may be operated upon and obliterated in the manner I propose; the same may also be said of the depressed cicatrices remaining after gun-shot injuries, though when bone has been shot away, as in *Case* 1, it may be possible only to improve the appearance by partial rather than complete obliteration of the depression.

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* See "Proceedings of the Medical Society of London," Vol. I., p. 105.

During my visit to America, in the year 1876, I learnt from the military surgeons at Washington that a large number of these cases of deeply depressed cicatrices existed as the result of injuries received in the late American War, and in the lecture on "Subcutaneous Surgery"* which I delivered at Washington, this operation attracted considerable attention, but to what extent it has been practised by the American surgeons, and with what success, I have not been able to learn.

Various operations have been performed for the purpose of diminishing the unsightly appearance of depressed cicatrices, but the one recommended in the present paper was, so far as I am aware, first suggested and performed by myself in the year 1864.

The operation consists—1. In subcutaneously dividing all the deep adhesions of the cicatrix by a tenotomy knife, introduced a little beyond the margin of the cicatrix, and carried down to its base; 2. In carefully and thoroughly everting the depressed cicatrix—turning it, as it were, inside out, so that the cicatricial tissue remains prominently raised; 3. In passing two hare-lip pins, or finer needles—in small cicatrices one needle will be found sufficient—through the base, at right angles to each other, so as to maintain the cicatrix in its everted and raised form for three days, as represented in Fig. 1; 4. In removing the needles on the third day, and allowing the cicatricial tissue—now somewhat swollen, succulent, and infiltrated—gradually to fall down to the proper level of the surrounding skin.

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* One of the series known as "The Tonor Lectures," established by Dr. Tonor, of Washington. Lecture VI. on "Subcutaneous Surgery; its principles and recent extension in Practice," delivered in Washington, September 19th, 1876, by William Adams, F.R.C.S., and published by "The Smithsonian Institution," Washington, April 1877.

FIG. 1.

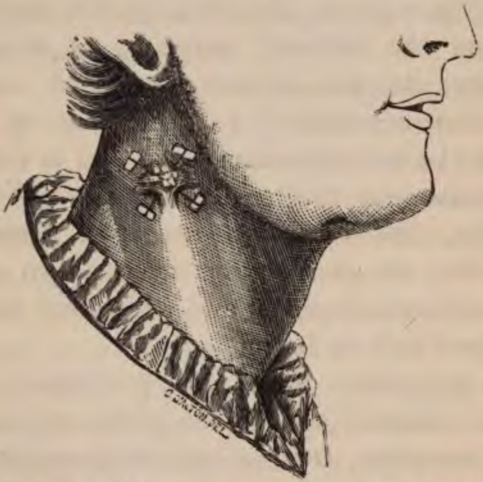

Fig. 1.—Cicatricial Tissue of a Depressed Cicatrix everted, and afterwards retained in this position by two needles, the extremities of which are raised and protected by pledgets of lint.

In performing this operation, one puncture with the smallest tenotomy knife, or a still smaller knife, such as Opthalmic surgeons use, will be found sufficient when the depressed cicatrix is of moderate size, and its adhesions are to fascia rather than bone. In larger cicatrices two punctures, one on each side of the cicatrix, may be necessary; and in some deeply depressed cicatrices adherent to bone, as in *Case* 3, in which the apex of the cicatrix was adherent to the lower jaw, and more than an inch from the external orifice, which was large enough to admit the tip of a finger, three punctures may be necessary. In this case three punctures were made, one on each side of the cicatrix and one a little beyond the apex of the depression, the last puncture being made over the margin of the lower jaw, whilst a probe was passed down to the apex as a guide to its position. Through these minute punctures the needles may be passed, after the cicatrix has been everted, so that even unnecessary needle-scars may be avoided.

The chief difficulty in the operation consists in the very careful separation of all the deep adhesions of the cicatrix; taking care to avoid making cutaneous punctures on the one hand, and on the other to avoid wounding any venous branches which may be in the immediate neighbourhood of the cicatrix, a difficulty which had to be carefully guarded against in the case of the young lady described as *Case* 2.

CASE I. *Deeply Depresssd Cicatrix on the Cheek after injury to the Malar Bone by a Pistol-shot.*—The first case in which I performed this operation occurred in an officer in the army, Lieutenant B., aged 30, who, during the Indian Mutiny, had received a pistol-shot in the cheek. A portion of the lower edge of the malar bone had been carried away by the ball, and a deeply depressed cicatrix remained adherent to the bone. When the muscles of the face were thrown into action, more especially in a smile or laugh, all the features seemed to be drawn towards the depressed cicatrix, which at once became painfully conspicuous.

This gentleman was very anxious to submit to any operation either for the removal of the cicatrix, or calculated to diminish its unsightly appearance; but I was at a loss to know what to suggest. I had on other occasions tried Dieffenbach's plan of subcutaneously dividing the deep adhesions of a cicatrix, and then moving it laterally to a new position, so as to alter its relations, and elongate or destroy its adhesions; but I had not found this plan very successful. I had also dissected out cicatrices and drawn the edges together, after cutting through fat and cellular tissue under the skin, on a plane parallel with its outer surface, so as to evert the edges of the skin; but this operation had failed to remove any deep depression. Many unsightly scars may be removed by this method, leaving only a linear cicatrix scarcely perceptible, but should any deep depression have existed before the operation, it will, to a greater or less extent, gradually return in a few months; the hole does not become filled up, so that this operation did not appear to be applicable to the present case.

Upon reflection, it occurred to me that if, after subcutaneously separating all the deep adhesions of the cicatrix, I could succeed in everting the cicatricial tissue, and retain it in the everted condition for a few days, the depression would become filled up by inflammatory infiltration, and obliterated by adhesions; so that the cicatricial tissue could not again fall down below the level of the surrounding skin. The depression would thus become obliterated, and all the adhesions of the cicatrix to the bone, fascia, and muscles, such as produced the conspicuous deformity in this case, would be effectually removed. The only doubt I had in my own mind was, whether in the course of time, absorption of the inflammatory lymph would take place, so that the depression would return to a greater or less extent. The case was, however, one of urgency and importance; I, therefore, determined to try the plan of everting the cicatrix, as above described, an operation which I performed on March 2nd, 1864. As the adhesions to the bone and the adjacent fibrous tissues were close and widespread, their separation was somewhat tedious and difficult; but I succeeded in thoroughly everting all the cicatricial tissue, and passed two hare-lip pins through its base, to retain it in its everted condition. On the third day I removed the pins, when the cicatricial tissue was in a thickened and succulent condition. It showed no disposition to fall into a depression again, and, indeed, remained somewhat too prominent; but in the course of a few weeks the cicatricial tissue fell to the level of the surrounding skin, and the improvement produced by the operation was extremely satisfactory. A portion of the malar bone having been destroyed, it could not be said that the depression was entirely obliterated, but the deep adhesions of the cicatrix having been thoroughly separated, there was no appearance of a depression towards which the features were drawn when the muscles of the face were thrown into action in talking or smiling.

Case II. *Deeply Depressed Cicatrix on Right Side of Neck, resulting from Chronic Glandular Abscess.*—

The second case which came under my observation was that of a young lady, Miss B., (Fig. 2), who was sent to me by my friend Dr. Sharpe, of Norwood. On the right side of the neck, a little below and behind the angle of the jaw, was a large and deeply depressed cicatrix, which had resulted from chronic glandular abscess. The base of the cicatrix was adherent to the fascia, over the sterno-mastoid muscle, and its depressed apex dipped down a little in front of the anterior border of this muscle. At this part, a branch of the jugular vein was in close proximity to the cicatrix, which in its size and general appearance very much resembled that represented in Fig. 3, but its apex was not so deeply depressed, nor were the adhesions quite so close and wide-spread, differences readily explained by its origin in glandular

FIG. 2.

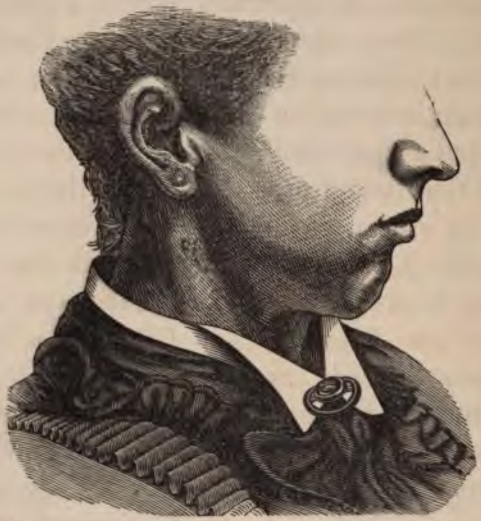

Fig. 2.—Complete Obliteration of Depressed Cicatrix in Neck, in Case 2, ten years after the operation.

abscess. This patient was most anxious to submit to any operation likely to be successful in the removal of such an unsightly depression, but the late Sir William Fergusson, as well as several other surgeons who had been consulted, advised that no such attempt should be made. I undertook the case, however, in full confidence of success, and the operation was performed on April 27th, 1866, in the same manner as described in the previous case; the only difficulty arose from the close proximity of the large vein, which was so intimately involved in the adhesions that the greatest care had to be taken to avoid opening it. With such precautions, however, the operation was in every way most satisfactory. The needles were removed on the third day, and the cicatricial tissue remained raised above the level of the surrounding skin for some time. For several months afterwards it remained a little thickened and prominent; absorption, however, gradually proceeded, and the level of the surface was restored, without the least inclination to any depression recurring.

I have frequently seen this young lady since, and up to the present date, now thirteen years after the operation, not only has the depressed cicatrix been entirely obliterated, so that no inequality of the surface exists, as shown in Fig. 2, drawn from a photograph taken in the year 1876, but, from the improvement in the cicatricial tissue, slight traces of it only remain, and require a close inspection to be detected.

CASE III. *Deeply Depressed Cicatrix on Right Side of Neck, consequent upon Abscess with Necrosis of the*

Lower Jaw.—H. S., aged 26, was sent to me also by Dr. Sharpe of Norwood, in October 1872. Her general appearance was healthy. On the right side of the neck, a little below and behind the angle of the jaw, was a deeply depressed cicatrix (shown in Fig. 3), large enough at its orifice to admit the end of the little finger, and its apex reaching to the surface of the jaw-bone. The deep surface of the cicatrix was adherent to the fascia, over the sterno-mastoid muscle, dragging from its anterior border. The free anterior border was formed by a prominent semilunar fold of the skin, three-fourths of an inch in length, and rendered still more prominent in some movements of the head, in consequence of the firm adhesions of the deep surface of the cicatrix. On the opposite side of the neck, a little below and behind the angle

FIG. 3.

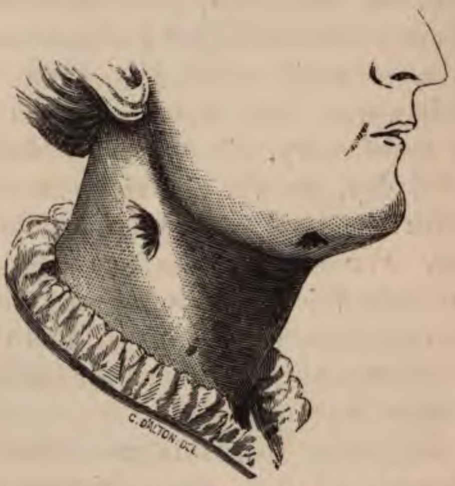

Fig. 3.—Deeply depressed Cicatrix in Neck after Necrosis of lower jaw.

of the jaw, was also a large cicatrix, with its deep surface adherent to the fascia, over the sterno-mastoid muscle, and having at its anterior free border a semilunar fold of skin, but without any deep depression. Its general appearance was that of a large, flat, and adherent cicatrix. There were also two small cicatrices, one on each side of the chin, depressed and adherent to the bone.

Of these cicatrices she gave the following history. Six years ago, being then twenty years of age, at the time when the last molar, or wisdom-teeth, were making their appearance, considerable swelling and inflammation occurred about the angle of the jaw, on the left side. The dentist could not force the mouth open, and she was unable to take solid food for a month. At the end of this time, the dentist, with difficulty, extracted the last molar tooth on the left side in the lower jaw; and it is said that some bony enlargement of the fang of the tooth existed. Abscesses about the angle of the jaw and necrosis of the bone followed: several pieces were removed by Dr. Sharpe, and the patient took away small pieces herself. The late Mr. Partridge removed a large piece of bone. A few months later, severe inflammation, with swelling of a similar character, occurred about the angle of the jaw on the right side, and the last molar tooth was extracted with difficulty about six months after the removal of the tooth from the left side. Necrosis of bone also occurred on the right side, and a number of small pieces continued to come away from time to time nearly up to the date of the operation. Altogether, less bone, she states, came away from the right side than from the left. Small pieces of bone also came away through two sinuses under the chin, indicated by the small cicatrices alluded to, and shown in the woodcuts. All the molar, and some other teeth on both sides of the lower jaw, had to be removed; and only six of her own teeth now remain in the lower jaw—viz., the four front teeth, and two bicuspids on the left side.

This patient was most anxious to submit to any operation for the obliteration of the large depressed cicatrix on the right side, which, from its unsightly appearance, and the popular prejudice against a supposed scrofulous constitution, had prevented her from obtaining a situation as lady's-maid. I therefore performed the same operation at the Great Northern Hospital, as that described in the previous cases. It was necessary to take great care to avoid opening one or two large veins leading to the jugular; and the separation of the cicatricial adhesions to the jawbone, and also the adhesions to the fascia over the sterno-mastoid muscle, was both tedious and difficult, a little venous hæmorrhage occurring. The cicatricial tissue, however, was thoroughly everted, and the needles introduced, as represented in Fig. 1. These were removed on the third day, when it was evident that a little suppuration had occurred. A poultice was therefore applied for a week, and then wet lint at night, and a piece of soap-plaster during the day. This is the only case in which any suppuration has occurred, and, although it rendered the treatment a little more tedious, it did not in any way mar the ultimate result, which at first I feared it might do. The cicatricial tissue remained in a somewhat infiltrated and thickened condition, above the level of the surrounding skin, for three or four months; but at the end of six months it had fallen to the level of the surrounding skin, and, being of a pale colour, no longer attracted attention. At this time, she obtained a situation as lady's-maid without difficulty. At the present time, nearly seven years since the operation, no trace whatever of the depression remains; the cicatricial tissue alone can be seen; but it is perfectly on a level with the surrounding skin, and has so much improved in texture and appearance, as very closely to resemble it. This is well shown in Fig. 4, from a drawing by Mr. D'Alton.

FIG. 4.

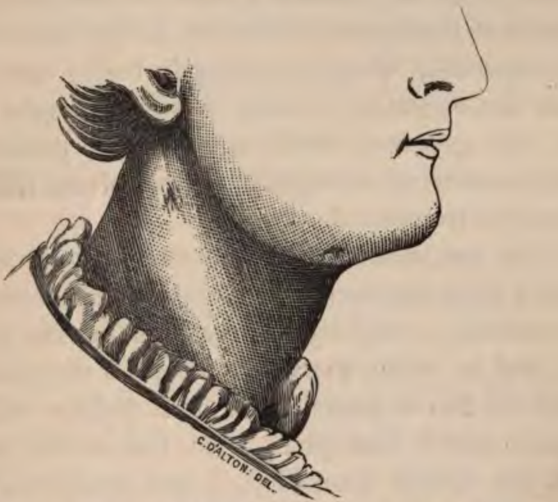

Fig. 4.—Obliteration of Depressed Cicatrix, represented in Fig. 3, from a drawing three years after operation.

After the operation, the cicatricial tissue always loses its shiny, membranous, and vascular character, like that on the left side of H. S., which has not been operated upon: it becomes thickened, and of an opaque white colour. The thickening of the cicatricial tissue results from its succulent condition during the three days it remains elevated by the pins, and the inflammatory infiltration at its base.

The permanent result of the operation is placed beyond all doubt by the two last cases described—one thirteen and the other seven years since the operation; and the completeness of the obliteration of the depression and the improvement of the cicatricial tissue, has surpassed my most sanguine expectations.

Cases of depressed cicatrices in the neck and face, more especially when occurring in ladies, are those in which the operation I have described might be done with the greatest advantage to the patient, completely removing unsightly scars, often difficult or impossible to conceal.

If the publication of some of the earlier cases in which I have succeeded, by the subcutaneous method, in removing unsightly depressions in the neck and face, and in which there has been no disposition to a return of the depression, should induce other surgeons to adopt this plan, with the careful attention to all the details described, I feel confident that the success obtained will establish the operation as an ordinary surgical procedure.

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